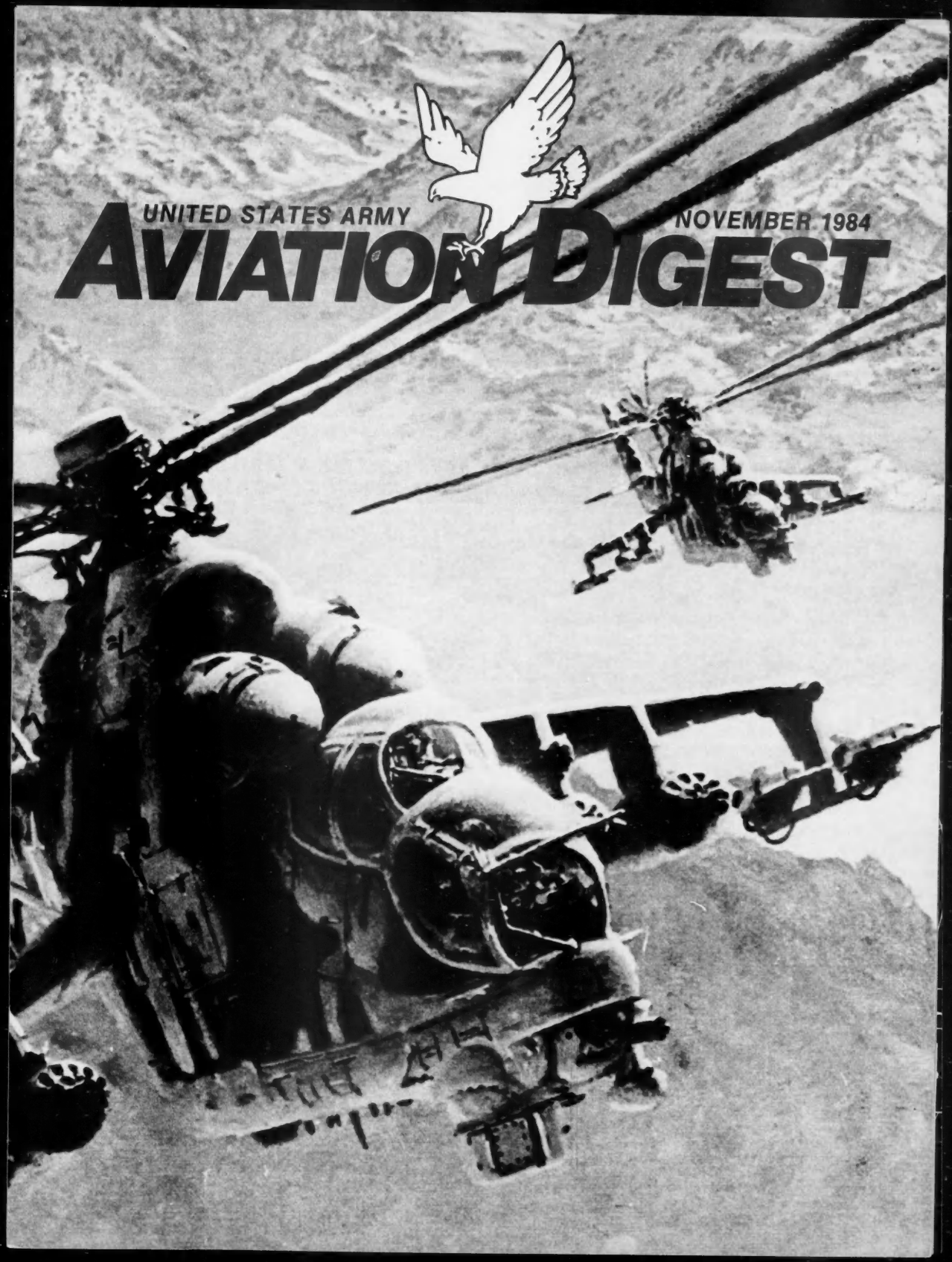
UNITED STATES ARMY
NOVEMBER 1984
AVIATION DIGEST

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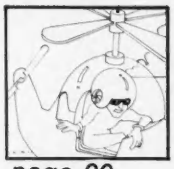

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The mission of the *U.S. Army Aviation Digest* (USPS 415-350) is to provide information of an operational, functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, Aviation medicine and other related data.

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Major General Bobby J. Maddox
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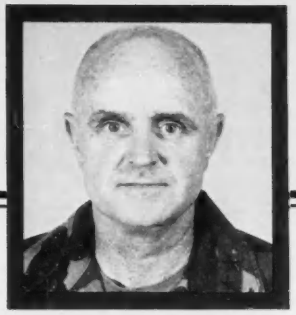

Project UPDATE

THE TITLE FOR my comments this month should make the reader wonder what new weapon system, training program, management system or personnel system I am about to discuss. Whichever category you picked, you are absolutely correct. The message concerns a medium that is organic to all systems in the Army. It provides procedures, direction and guidance while linking the developer, trainer and commander to the system user. *Publications are that medium,* and the Aviation Center is on the leading edge of a program that will drastically change the way we write, produce and use printed materials.

The new program is called UPDATE. Under the direction of COL Frank Milwee of The Adjutant General's Office (TAGO), the program recently produced the Army's first UPDATE field manuals—FM 1-100, "Combat Aviation Operations"; FM 1-107, "Air-to-Air Combat"; and FM 1-240, "Instrument Flying and Navigation for Army Aviators."

The impetus for a new publishing system comes from the huge publishing backlog that exists in the present system. It has become increasingly clear that the present system can no longer effectively and efficiently maintain the necessary flow of current and usable information required to keep the user ready to fight. "New books" are in need of revision by the time they are printed and distributed to the user. Proponents must write changes and have them distributed in an attempt to maintain publications that are current. The users must employ scarce resources to physically post these changes to their basic copy. These bulky, looseleaf publications require a binder and collectively require considerable shelf space for storage. The snowballing effect of this unwieldly system makes it hard to maintain an up-to-date information base.

UPDATE demonstrates a publishing logic that replaces costly, unreliable, manpower-demanding printed products with economical, labor-efficient printed communications that are complete and up-to-date. An UPDATE product does not take as long to produce. It is keystroked on computer discs using state-of-the-art computer terminals replacing typewritten manuscripts. It is printed in book form on modern laser printers instead of using old-fashioned printing presses. The UPDATE product weighs less and distribution costs can be cut by as much as 90 percent. UPDATE products do not require binders; they are complete, up-to-date issues. As changes occur, a new issue will be printed and the old one can be thrown away. Users will no longer need to dedicate scarce resources to post changes.

The ultimate goal of the UPDATE program is to increase readiness by providing the most current, up-to-date information to the field in the most useful form. To be successful, we must have your feedback. Each UPDATE publication has a reader response card for your comments. Every recipient of an UPDATE product should review the publication and submit this card to TAGO. The card is simple to fill out, can be dropped in the nearest mailbox and will help us give you the type of product you want.

In addition to the reader response card, you will get a subscription card in your UPDATE publication. Use this card to order the copies you need. If you don't order them, you will not get them; it is that simple.

The Aviation Center point of contact for the UPDATE program is the Publications Division in the Directorate of Training and Doctrine. Any comments you have in addition to those you make on the reader response card should be sent to:

Commander
U.S. Army Aviation Center
ATTN: ATZQ-TD-P
Ft. Rucker, AL 36362-5000

UPDATE publications are the wave of the future. AIR ASSAULT!

Army Aviation

1984 to 2015

Colonel E.H. Grayson Jr.
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THERE HAVE BEEN a number of recent articles in this magazine which have addressed a variety of specific topics such as current tactics, self-deployment, the Army Training and Evaluation Program support, air-to-air combat, crossing the forward line of own troops (FLOT), night training, forward arming and refueling point movement, etc. The list goes on and on; and it appears that what we are attempting to tell the Army (and "us" aviators) is that we can support the AirLand Battle doctrine; that we can fulfill a vital role in any war, regardless of where *and* how violent; and that *yes,* the senior leadership made the right decision when we became a full-fledged partner with the other combat, combat support and combat service support branches in our Army.

AirLand Battle is much more than just the way we plan to fight on the battlefield. It is a philosophy, a mentality and an attitude toward war which recognizes and identifies—and tries to define the framework of war. Army Aviation provides, for the first time, a single capability to link the battlefield dimensions of width, breadth, height and time together. If one adds the dimension of tactical agility, Army Aviation also provides the commander a greater capability than ever existed before to marshal critical assets for decisive action at the time and place of his choosing.

Within the entire inventory of Army systems today, there are none that match or exceed Army Aviation's capability to support the AirLand Battle in:

- Providing rapid mobility.
- Providing indirect firepower.
- Seeing deep and attacking deep.
- Plugging gaps.
- Reacting to penetrations.
- Rapidly moving soldiers, ammunition, light air defense and artillery systems.
- Using economy of force measures.
- Matching decisive combat power at critical places in a rapid manner.
- Providing rapid logistical support from the corps support command/division support command straight to user levels.
- Providing tactical recon and surveillance.

I fully realize that making a statement of Army Aviation capabilities as those listed above is a mouthful—and one that undoubtedly will be debated. However, they are valid! The "*how to*" question is the one that Army aviators at all levels must clearly understand and demonstrate. No one will argue that Army Aviation can provide the rapid mobility that is so inherent to winning on the modern battlefield. Certainly terrain obstacles pose no major problems for our current family of helicopters, and the ability to move rapidly over extended distances is unmatched by other systems. But there is much more to rapid mobility than skipping around the battlefield at 100 knots, and this is where the learning process is critical. The Aviation Center and School at Ft. Rucker, AL, must teach the ***how, why*** and ***significance*** of this rapid mobility capability.

Those from the Field Artillery, and the tankers, may argue that the attack helicopter cannot provide the indirect or direct firepower of the cannon artillery or the main tank gun. They are dead wrong for a number of reasons. There may be times when massed fires from a direct support 155 mm battalion will put more steel on the target at a greater distance beyond the FLOT. However, this might also be the exception rather than the rule. Consider the firepower of the AH-1S Cobra or AH-64 Apache whereby 6 or more helicopters (up to 21) can fire 38 to 76 rockets each. This potent concentration of indirect fire more than equals that of an entire division artillery.

The same holds true when it comes to killing tanks or other armored vehicles. An AH-1S platoon, or AH-64 tank killer teams, can deliver a greater concentration of antitank fire from concealed positions than any ground system. Moreover, the inherent mobility and flexibility of the helicopters provide a much greater capability to concentrate this firepower over and over again, wherever needed on the battlefield.

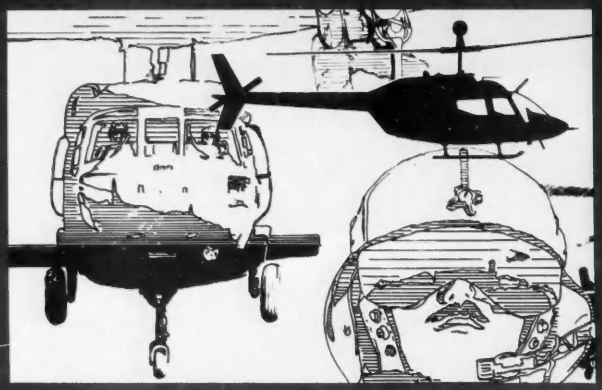
AirLand Battle is the framework which we have determined is the best manner in which we can apply our resources, current and projected, against the range of threats which we face.

Where Will Army Aviation Fight?

In a Mideast rapid deployment scenario, the first Army unit to locate the enemy probably will be the scout pilots. Simultaneously, the first Army unit to provide indirect fires on the approaching enemy force most likely will be the attack helicopter, firing area fire 2.75 inch rockets. Finally, the first enemy tank killed will more than likely be by a TOW or HELLFIRE delivered from an AH-1S or AH-64.

Initial forward air control of tactical Air Force assets may very well be from a scout helicopter. Army light infantry tank killer teams undoubtedly will be deployed forward by UH-60 Black Hawk helicopters. CH-47 Chinook helicopters probably will be supporting port and airfield clearing operations, and rapidly moving forward ammunition, air defense systems, light artillery (to include towed 155 mm), engineer equipment, mines, etc., and all of this will likely occur before tanks, personnel carriers, self-propelled artillery, etc., even clear the ships, ports or airfields.

This scenario can somewhat be transcribed into either the European or Korean theaters. There is simply no situation, whether intense or less, in which Army Aviation cannot play a significant role as an integral part of the combat arms. How many Return of



AirLand Battle doctrine is best suited against well-equipped, modern forces using Soviet style tactics. It is specifically effective against the threat in Central Europe, the Middle East and Korea.

Forces to Europe (REFORGER) exercises have found aeroscouts locating the main attack; attack helicopters engaging and destroying enemy parachute assaults deep into the rear areas; conducting joint air attack team (JAAT) operations; supporting critical logistical moves; supporting counterattacks; and performing suppression of enemy air defense (SEAD) operations? The list goes on and on. So the bottom line is yes, we have come a long way and we *can* support the AirLand Battle, Army 21* or any other future concept. The 'how to' is our job.

The Aviation School must take the lead in pulling together academic programs of instruction (POI) that teach the 'how to' at every level of the courses offered at Ft. Rucker. We must:

- Flood the system with field circulars so that units can begin training in critical areas while they wait for field manuals (FMs).
- Capture lessons learned from the past, consolidate them into manageable packets and get them into the field.
- Ensure that the close ties developed with Ft. Benning, GA (Infantry), Ft. Knox, KY (Armor) and Ft. Eustis, VA (maintenance/logistics) over the past 25 years remain strong and that joint efforts with them continue as Army Aviation grows.
- Support every field training exercise (FTX) that occurs, learn what problems the other combat and support arms must deal with and then help to resolve them.

AirLand Battle Training.

Commanders cannot take tactical and technical competence of subordinates as a matter of fact. They must participate in the training process as follows:

- Enhance knowledge.
- Reinforce skills.
- Introduce new concepts.
- Demonstrate the 'how to.'

Commanders must train to realistic standards by:

- Injecting discipline into training.
- Putting stress into tactical exercises.

Commanders must develop tomorrow's leaders! Army Aviation must *train to fight as it intends to fight* if it is to continue making great strides forward in the development of its combat capabilities.

Unquestionably the critical element in training is to train as we intend to fight. Commanders at all echelons have major roles to play within the AirLand Battle training arena. Your obligations are to demand excellence, know your profession and ensure that your subordinates know theirs. Challenge your junior

*The rationale behind the Army 21 concept is to develop a viable vehicle with which to guide future organizational alignments, doctrine, training and materiel requirements. Next month watch for the article, "Army Aviation's Concept for Army 21," by Major Marion Tyler.

leaders to think, plan and decide under realistic conditions. Have the courage to accept risks and the conviction to allow for honest errors. Adopt Josephus' attitude that "drills must be bloodless battles, and battles bloody drills."

Ensure that there is a vigorous training effort in the combat and combat support Aviation units designed to support the ground commanders 24 hours daily, 7 days a week, regardless of the weather. In fact, providing critical support during adverse weather periods should be emphasized. After all, when you are hovering in the trees in an attack position on a foggy day in Germany or Korea, you have the advantage over the tanks—they are buttoned up and their visibility is limited far more than yours. However, you must train extensively to be able to cope with the adverse weather and get to the tanks, which have much less of a problem in this respect.

Get The Word Out On What's Happening.

One way to get the word out is through the Directorate of Standardization and Evaluation (DES), located at the Aviation Center. This directorate unquestionably has a better picture of what is going on than any single agency anywhere. Why not consider compiling a general quarterly report and send direct to unit level, comments from the DES, to include the U.S. Army, Europe (USAREUR) Safety and Standardization Board, U.S. Army Forces Command aircraft reliability and maintainability simulation and Aviation operational readiness safety evaluations to include, "Who is doing what; what's working in Korea; specialized training at Ft. Campbell, KY; what's happening at Ft. Hood, TX; etc"? It is imperative for Aviation unit commanders to know what the rest of the Aviation arena is doing, particularly since new innovations in Aviation tactics, techniques and procedures are being developed worldwide and are rapidly changing as we move into the mid-1980s.

Combined Arms Team: The Key.

Can Army Aviation fight in this arena? Unquestionably! Do we fight alone? Certainly not.

Our role in fighting on the modern battlefield is as an integral member of the combined arms team; to reinforce the eyes and ears of ground commanders from vantage points not available to them by other means; to perform a multitude of essential missions for the armored cavalry regiment and division commander including reconnaissance, long-range indirect fires, pre-positioning air defense and towed artillery systems, supporting and augmenting direct fires against enemy formations by our tanks and ground TOW/Dragon systems; finding the enemy command posts with our electronic systems; positioning tank killer teams throughout the main battle area; moving critical ammunition as far forward as possible; air assaulting infantry troops into needed areas; moving mines, bridging equipment, medical items, petroleum, oils and lubricants and a multitude of other significant logistical items forward; plugging gaps and yes, defending key terrain by fire.

It is imperative to study lessons learned from the past before pinning down doctrine and concepts for the future. I would hope that the new academic POI will include a fairly hefty block in Army Aviation history:

- What did we learn from the French use of airmobile and air assault armed helicopters (UH-21s) during the war in Algeria? Major Hilaire Bethouart wrote about it in his article, "French Army Aviation," in the May 1960 issue of the *Aviation Digest*.
- Did we learn anything from the highly successful British operations in Malaya that lasted from 1948 to 1960? The British made good use of helicopters and light aircraft in that campaign, as Lieutenant Colonel M.W. Sutcliffe wrote in his article "Malayan Operations" in the October 1962 issue of the *Aviation Digest*.
- What did we learn from 2 years of extensive testing, training, tactics, etc., by the 11th Air Assault Division (Test)? Have we recaptured how the division successfully fought the 82d Airborne Division during the 1964 version of the Swift Strike operation?...or moved major portions of the division from Ft. Benning, GA, to Ft. Stewart, GA, during numerous FTXs to engage the 2d Infantry Division (Mechanized) and armor battalions? Where are the reports gathered by the test and evaluation agency that monitored division operations for 2 years?
- What have we captured from the Army Aviation support during past REFORGER exercises? Do we have down on paper that flying in Europe is not like flying at Ft. Campbell? Have we learned how USAREUR Aviation units conduct cross-FLOT operations against a sophisticated air defense threat, which is not to be found to the same extent during FTXs in the continental United States?
- Where are the lessons learned from 101st Airborne Division (Air Assault) operations in Egypt?
- Who is compiling lessons learned from ongoing JAT operations? We have a new joint Tactical Air

Command/U.S. Army Training and Doctrine Command (TAC/TRADOC) manual out, but does it work? Does it need changes?

- Who out in the "big training world" is still using command and control helicopters, or have the lessons learned from Lam Son 719 forever made an imprint that command and control aircraft and ZSU-23s don't mix?
- Who has put anything to the field that addresses how to change an AH-1 engine in the field at night using a borrowed wrecker and a portable lighting set?
- What critical authorized stockage list/prescribed load list and other critical support items are essential when deploying for FTXs?
- How does the general support (GS) battalion contact team system work—or does it work? Who sends in reports, suggestions, etc., to Ft. Rucker or Ft. Eustis to ensure that the word gets out?
- How does the GS maintenance company deploy? Can it deploy, or is it stuck on the airfield because of insufficient vehicles and nonportable equipment?
- How does one pump Aviation fuel (JP4) from a railcar into a 10,000 gallon tanker? Is there a better manner than the way it is done in USAREUR?
- Who is capturing lessons learned from USAREUR and other major Army commands, from Air Force forward air controllers running missions and from the front seat of scout helicopters?

At the tactical level of war, which is where Army Aviation fits in, combat involves techniques used to destroy the enemy of seize terrain in short term battles or engagements.

• Who is pulling together lessons learned from night training? It is understood that critical to the success of night operations is the ability of the Air Force to perform missions of counterair, interdiction, close air support and reconnaissance. Simultaneously, it is equally as significant and critical that Army Aviation provide its full support complement at night.

• Where are these lessons learned? Along with significant advances in night combat techniques, it is equally as essential that both services develop consistent concepts for employment and complementary training programs to ensure *and* maximize effective joint combat.

• Who is teaching joint SEAD (JSEAD) to Army aviators? Does anyone use the TAC/TRADOC unclassified training text to train for this essential mission? Whether supporting tactical Air Force assets with our indirect fire systems, or crossing the FLOT ourselves, it is vital that local and campaign JSEAD operations be studied and understood.

• Who monitors after-action reports from Red Flag which unequivocably state that if helicopters don't have the Have Quick radio, that it is impossible to communicate in a high jamming environment?

• In 1963, the 227th Air Assault Helicopter Battalion developed a contingency plan to move the entire battalion from Ft. Benning to Trinidad. The only outside support was to be provided by CV-2 (now designated C-7) Caribou from the 10th Transportation Brigade which would pre-position JP4 and navigational aids. Where is that plan today, and could it have assisted in the recent Urgent Fury deployment?

• In 1969, in the Republic of Vietnam it was standing operating procedure (SOP) in the 101st Airborne Division (Air Assault) that when conducting air assaults into the Ashau Valley that detailed planning ensured flight routes transcended the worst possible terrain. Why? Because, for the most part, 37 mm and 23 mm antiaircraft systems (which were numerous) were tied to road networks, thus rugged terrain offered some safety from these weapons. Where is this SOP, and how can it fit in Europe, Korea or the Mideast today? Were the lessons learned from 1969 included in the soon-to-be published cross-FLOT operations FM? Read Colonel Bill Pages' March 1980 *Digest* article entitled "Roller Coaster Operations Across the FEBA." Have we capitalized on his experience and lessons learned from commanding a combat Aviation battalion in Korea? Did we record that the continental United States attack helicopter battalion conducting cross-FLOT operations during REFORGER 78 was destroyed every time it approached the FLOT?

Does this mean that if we conduct detailed intelligence planning, take full advantage of existing terrain and plug into the JSEAD effort, and are included as an integral part of the combined arms team that we can conduct cross-FLOT operations to support the deep attack; support the battle at the FLOT; and support the rear area battle? Certainly we can!

What's Down the Road?

Our Aviation equipment is better than ever, with even better and more sophisticated systems scheduled to join the inventory. We are an expensive branch; however, the Army leadership is fully supporting the cost of both aviator training and equipment as a result of being convinced that Army Aviation will unquestionably provide an invaluble role on tomorrow's battlefield. Will this decision be justified? Certainly it will, but we, the Army Aviation community, are the ones who must ensure our leadership made the right decision. Yes, we've come a long way since the first Army L-4 Cub roared from a Navy carrier off North Africa and from the early days of OH-13 Sioux and a few UH-19 Chickasaw operations during the Korean War. Yes, we've come a long way from the absolutely invaluable contribution Army Aviation made during the Vietnam War; and yes, Army Aviation can play a major role in the AirLand Battle as an integral part of the combined arms team. You are the ones who will make it work.

"Those that cannot remember the past are condemned to repeat it."

George Santayana

TACTICS

Captain Ron Klein
Combined Arms Division
Department of Combined Arms Tactics
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Fort Rucker, AL

AVIATION EMPLOYMENT
in
Defensive Operations

This is the third and final article in a series covering the employment of Army Aviation in each of the principal operations. The first article, "Aviation In Special Purpose Operations," appeared in the September 1984 issue. It was followed in October by "Aviation Employment In Offensive Operations." Copies of these articles can be obtained by writing to Editor, *Aviation Digest,* P.O. Drawer P, Ft. Rucker, AL 36362-5000.

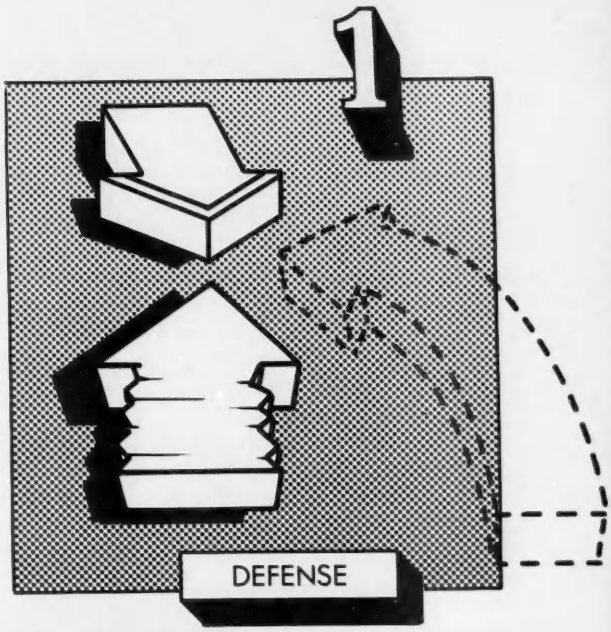
THE AIRLAND Battle emphasis on initiative and the aggressive pursuit of fleeting opportunities does not imply that defensive operations are of secondary importance. We must strive to incorporate the offensive spirit in all defensive operations. Napoleon wrote in his memoirs, "The entire art of war consists of a well-planned and exceptionally circumspect defense followed by rapid, audacious attack."[1]

In many respects the employment of Aviation in the defense is much more difficult than in the offensive operations. The enemy decides when and where to attack, and the mobility of current weapons systems makes response times short. Discerning which enemy attacks are feints, which are supporting attacks, and which is the main breakthrough attack further complicates the defense. The mobility of helicopters makes them an ideal force to reconnoiter and to respond to threatened sectors with the firepower necessary to destroy the enemy first echelon forces while friendly ground maneuver forces are repositioning.

Success in such attempts depends on more than a rapid response. The effectiveness and survivability of Army Aviation units also hinges on such determinants as the availability of early warning information assets, the suppression of enemy air defenses (SEAD), and the selection of a command or support relationship that yields flexibility commensurate with our mobility.

FM 100-5, "Operations," specifies four types of defensive operations: *the defense, the delay, the defense of an encircled force and rear area protection operations.*[2] The other defensive activities identified in FM 100-5 are *counterattacks and spoiling attacks, reliefs to continue the defense* and *withdrawals.* The planning and conduct of counterattacks and spoiling attacks closely parallel the attacks covered last month in the article, "Aviation Employment in Offensive Operations." Therefore they will not be discussed here, nor will the *conduct of a relief to continue the defense,* which is so similar to the special purpose operation *relief to continue the attack.*

Although the conduct of withdrawals may be either under enemy pressure or without enemy pressure, they are all planned as withdrawals under enemy pressure and most of those planning considerations are covered below under the category of *delays.* Consequently, this article is limited to the four primary defensive operations.



DEFENSE

Although the overall advantage in the campaign lies with the attacking force, a well planned defense and responsive early warning systems can significantly reduce that advantage. And once the battle is engaged, the force ratio advantage favors the defender. There are several contributing factors that result in this advantage. When enough warning has been received to thoroughly prepare a deliberate defense, the defender:

- is dug into protected positions (reduced vulnerability with concealment),
- has clear fields of fire,
- has emplaced obstacles,
- arranges for converging direct and indirect fires,

1. FM 100-5, page 10-4.
2. FM 100-5, page 10-4.

- Enjoys greater accuracy (since he's stationary), and
- is familiar with the terrain.

To compensate for such a local advantage, the attacker attempts to funnel his force into a narrow breakthrough sector where he can achieve an overwhelming force ratio advantage, attack with surprise and move with enough speed to preclude reinforcements on the defender's part.

Although there is a continuous battle throughout the entire depth of the battlefield, an artificial separation into three areas is often done to facilitate a discussion of the special aspects of each. These areas are the deep battle (cross-forward line of own troops (FLOT)), close-in battle and the rear area protection (RAP) operations.

In defensive operations, the close-in battle is further divided into the covering force area (CFA) and the main battle area (MBA) (figure 1).

Deep strikes across the FLOT are applicable in offensive operations and defensive operations. They are generally conducted for one of three purposes:

- To take out specific weapons or enemy assets.
- To delay the enemy.
- To destroy large concentrations of enemy forces.

FIGURE 1: Organization of the Defense.

Army Aviation in the Deep Battle

Although Aviation supports and conducts cross-FLOT operations (raids, reconnaissance-in-force), a more frequent employment is in Aviation unique missions. In a high intensity environment our current capabilities are limited. Even with effective SEAD and accurate information on the location of targets, aircraft losses due to enemy fire during day operations would be exorbitant. Deep strikes at night and during obscured weather conditions improve survivability, but current equipment capabilities do not permit acquisition or engagement of targets at an appropriate stand-off range. The fielding of the AH-64 Apache and the OH-58D Kiowa closes this gap and will significantly improve our cross-FLOT capability. With accurate intelligence, attack helicopters can destroy armor and mechanized vehicles, enemy command posts, fuel trucks, ammunition convoys and other high-payoff targets within their fuel range. Indicative of Aviation capabilities in this spoiling attack role are the 720 HELLFIRE missiles that an AH-64 battalion can carry across the FLOT. Longer range missions requiring the establishment of forward arming and refueling points in enemy held territory are much riskier, require a major allocation of assets and will be executed less frequently.

Army Aviation in the Close-In Battle

The CFA commander is tasked to identify the main breakthrough attack, delay the enemy and force him to deploy into his attack formation, thereby revealing his intentions and capabilities. Aviation units operating in the CFA will be under the control of the CFA commander, who may be a ground maneuver commander or the combat Aviation brigade commander. The covering force is normally tank heavy.[3] Regardless of who the CFA commander is, air and ground cavalry forces should be deployed along the FLOT where their mobility permits them to screen the front with a minimum of forces. They can determine the size

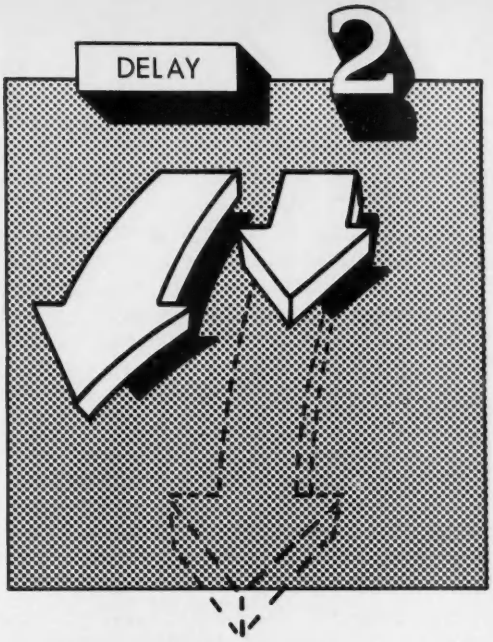
of enemy forces crossing the FLOT and relay that information immediately to the CFA commander. The CFA commander then can move forces in reserve and from less threatened sectors to delay or destroy the enemy in the breakthrough.

In an economy-of-force mission, cavalry forces (reinforced by attack helicopters, as needed) can be assigned the defense of the remaining ground.[4,5] In restrictive terrain, assault helicopters can move troops to reinforce blocking positions, strong points and delay positions. As the battle progresses toward the forward edge of the battle area it becomes increasingly more difficult to pull back relatively immobile forces such as infantry or those that have lost their prime movers. Assault helicopters should be planned on to assist in the extrication of those forces.

If the CFA commander succeeds in delaying the enemy force, and provides the MBA commander with sufficient advance notice, specifically about where the breakthrough(s) is expected, what follows is a particularly time-critical operation to move forces to reinforce the anticipated breakthrough sector. Assault and medium lift helicopters can make a significant contribution to the expeditious movement of light infantry, towed air defense artillery weapons, artillery and other equipment.

The MBA is where the decisive battle is fought. There the commander may defend, delay and/or counterattack. Defense courses of action can vary greatly and it is imperative that supporting Aviation units clearly understand the commander's intent as the unpredictable battle progresses. Attack helicopters should be fully employed here to destroy the enemy force. Because of their mobility and firepower, attack helicopters are the quickest and most effective means of stopping and destroying enemy tank and mechanized formations that have broken through. Assault helicopters will be able to contribute in a variety of roles including the repositioning of forces, resupply, and in command and control. (Rear area operations are discussed later in this article as a separate defensive operation.)

3. FM 71-100, page 5-13.
4. In a division operation, air cavalry forces from the corps will have to supplement the division's organic air cavalry.
5. FM 71-100, page 5-3.
6. FM 100-5, page 12-2.



DELAYS

The intent of delays is to gain time. Destruction of the enemy force is of secondary importance. Defensive operations need time to succeed and there are a variety of circumstances when the commander may order delays. A few include:

- In the covering force battle
- To cover withdrawals
- To prepare defenses
- To participate in an economy of force effort
- To gain information
- To prepare a counterattack.

Delays can result in the destruction of an enemy force much larger than the delaying force. They gain time by forcing the enemy to concentrate repeatedly against successive battle positions. As enemy units begin to deploy for the attack, the delaying force withdraws to new battle positions. The enemy must then repeat the same time-consuming deployments and costly attacks at the next positions. At the same time, deep attacks slow the enemy's advance and prevent him from massing overwhelming combat power against the delaying force.[6]

The delay is much more difficult to execute if the initiative is left to the enemy. The delaying commander should devise a scheme of operation

that seizes the initiative even if only temporarily and even if in a limited locale. Successful conduct of a delay requires the utmost in command, control and mobility.[7]

The execution of delays is extremely difficult because the delaying force must simultaneously:

- Maintain contact with the enemy to avoid being outmaneuvered.
- Cause the enemy to plan and conduct successive attacks.
- Preserve its freedom to maneuver.
- Maintain operational coherence.
- Preserve the force.[8]

The conduct of delays may be either from successive positions or from alternate positions (figure 2). In fast moving, high threat situations, delay forces will invariably be forced into using the more complex delay from alternate positions.

Army Aviation in the Delay

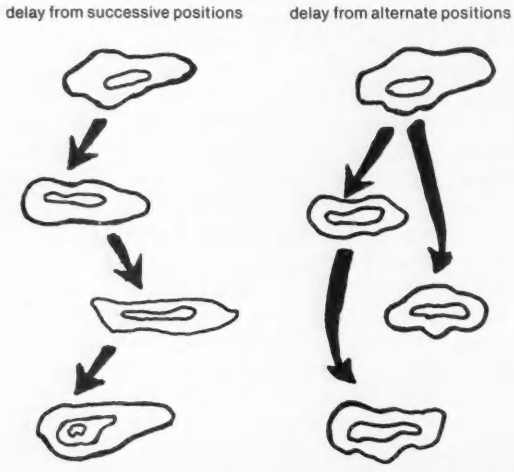
A major risk to the ground forces executing delays is the possibility of becoming decisively engaged and losing the freedom to maneuver. This occurs because in most terrain the ground force's limited visibility results in the enemy forces often achieving greater gains to the flank than the delaying forces are aware of.

This decisive engagement also may occur when the enemy unexpectedly masses overwhelming combat power very quickly. Attack helicopters are perfectly suited to assist these ground forces to disengage. Unimpeded by terrain and able to respond on short notice, attack helicopters can stand off to the flanks and engage the enemy with enough suppressive fires to permit the ground forces to pull back. This is typical of the integration of ground cavalry and air cavalry forces conducting a delay mission. Attack helicopters can also launch limited counterattacks to divert the enemy and permit the disengagement by the delaying force.

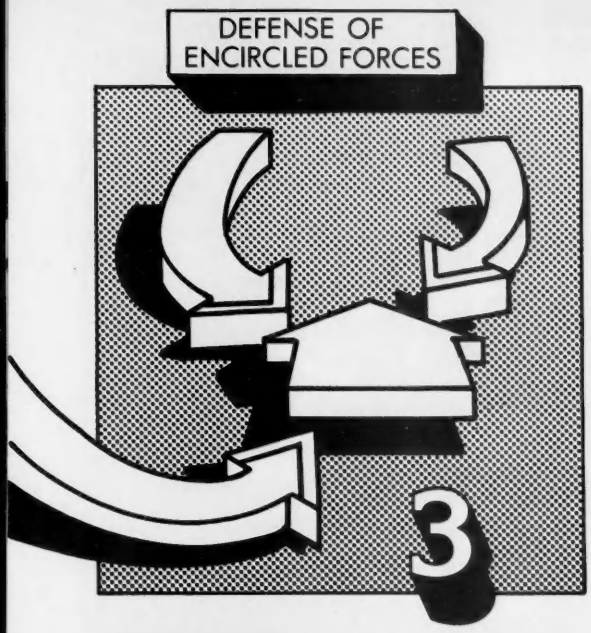
Assault helicopters can rapidly reposition forces to more threatened sectors. Care must be taken in the use of assault helicopters to move infantry forces from one delay position back to the next when facing a mechanized threat. The helicopters will be subjected to heavy indirect fires, and in rapid moving situations enemy armor and mechanized forces may be able to bring the helicopters under direct fire before they can pick up the troops and take off.

Air cavalry forces and attack helicopter battalions can conduct delays by themselves in some situations. The enemy force must be mounted and the helicopter delaying force cannot be assigned time limits that restrict its rearward movement.[9]

FIGURE 2: Types of Delays.



7. FM 71-3, page 4-37.
8. FM 100-5, page 12-2.
9. Because a) the helicopters can mass great firepower but not hold terrain, and b) the helicopters are particularly vulnerable to the rolling barrages of enemy artillery, pure Aviation is limited to delays that don't specify the amount of time to be gained.
10. FM 100-5, page 13-1.
11. However, depending on the terrain and weather, helicopters are less likely to have this capability in high-intensity warfare.
12. The timing of when to destroy the friendly equipment to be abandoned will be one critical aspect of this operation.



DEFENSE OF ENCIRCLED FORCES

The nonlinear battles of low and mid-intensity conflicts as well as the rapid pace anticipated in a high-intensity war will inevitably result in friendly forces becoming encircled. In high-intensity environments, threat doctrine advocates rapid movement that necessitates bypassing strong positions and leaving them for follow-on echelons.

Although encirclement is a grave situation, it is imperative that the unit(s) encircled maintain its combat effectiveness. In many types of terrain, like military operations on urbanized terrain, it is anticipated that outnumbered, encircled forces can fight effectively for long periods. The current Iraq-Iran war has certainly reinforced this concept. The commander of the encircled forces faces three alternatives:

- Dig in and defend in place.
- Conduct a break-out attack toward friendly forces.
- In extreme cases, divide the force into small patrols and attempt to exfiltrate during limited visibility.[10]

The decision as to which option to select depends on many factors, not the least of which includes the size of one's force. Choosing exfiltration for a brigade or a break-out attack for a squad would rarely be the first choice. Once encircled, the decision must be made quickly and implemented immediately. With each passing minute the enemy strengthens his position and learns more about your specific weaknesses. If time is not critical, the enemy will likely attempt to destroy the encircled force by fire (artillery, direct, close air support). If time is critical the enemy will probably attack with a series of penetrations to destroy the encircled forces piecemeal.

Army Aviation in the Defense of Encircled Forces

Helicopters should not become a part of the encircled force. First, they have the mobility to avoid such a situation and second, it is not in the ground commander's best interest to direct them to remain with the force. An encircled force can be expected to receive a great deal of artillery and air force bombardment which may destroy the helicopter force. And, it is improbable that an encircled force would have the necessary fuel and ammunition resupply to operate the helicopters even if protected locations (underpasses, tunnels, underground parking lots, etc.) could be found. However, the contribution of helicopters can make the difference between success and failure of encircled forces. Normally the encircled forces would be within the range of helicopters operating from terrain held by friendly forces. The same capability we consider in cross-FLOT operations enables us to assist the encircled force.

When the encircled commander elects a break-out attack it will often be conducted in conjunction with a link-up attack by friendly forces. Here air cavalry forces may be able to reconnoiter enemy positions as the link-up attack progresses and recommend routes where the least resistance is for the break-out force. Attack helicopters may be able to join the break-out force for the initial assault, add their antiarmor firepower and/or create a diversion elsewhere to enhance the success of the break-out attack. The rear guard may be considerably smaller and more mobile if it can be reinforced by attack helicopters during the critical early phases. In some instances it may be feasible to land assault helicopters (most likely at night) within the encircled force to extract the injured.[11] In other cases, particularly with small encircled forces, assault helicopters could conduct an operation similar to a raid where they extract the entire encircled force.[12]

When the commander elects to defend in place, assault helicopters may be able to resupply the encircled force with critical ammunition and supplies. If the situation is particularly fluid, air cavalry forces may be able to identify the movement of major enemy forces and attack helicopter battalions can often divert, delay or destroy them *before* they attack the encircled force or during the defense once the attack has begun.

In cases of exfiltration attack helicopters can assist in the diversion or rear guard action to initiate the escape. In low-intensity conflicts, mid-intensity warfare or fluid high-intensity warfare, assault helicopters can often pick up patrols at preselected locations (like our pilot pick-up points) to limit the distance the patrols must travel.

REAR AREA PROTECTION OPERATIONS

As mentioned, the defense of the rear area is an integral part of the overall depth of the battlefield. RAP operations will be continuous. They will be ongoing in all defensive operations and offensive operations. There are two components to RAP: rear area combat operations (RACO) and area damage control (ADC). Note: The terms RAP and RACO are being replaced by the term "rear battle" in FM 90-14 which will provide doctrine for conduct of the rear battle. The manual is scheduled to be published in June 1985.

RACO are those operations taken to prevent or combat enemy forces within our rear area. It should be apparent that even a few small ambushes of resupply trucks or blown bridges in our rear area will result in a significant degradation of our combat effectiveness. The enemy's capability to destroy or disrupt our rear area operations depends on his equipment, and in general, the factors of mission, enemy, terrain and weather troops available and time apply. To delineate the type of threat operations in our rear area, they are subdivided according to the extent of enemy capabilities. They are:

Threat level I — Enemy agents, saboteurs, terrorists

FIGURE 3: Cavalry reconnaissance around a mobile support area.

Threat level II	Sabotage attacks and diversionary operations by enemy military units (generally platoon size)
Threat level III	Airborne, airmobile, ground maneuver or amphibious enemy forces attacking (battalion size or larger)[13]

Army Aviation in RAP Operations

Any combat force that the commander diverts from the deep battle or close-in battle to conduct RAP results in a lessening of firepower "up front" and must be avoided, except when absolutely necessary. This is also true of Aviation resources except that due to Aviation's extraordinary comparative mobility we can often operate in the close-in battle and have an on-order mission to respond to enemy incursions to the rear area. This is a capability other forces (armor and infantry) do not normally have. Consequently commanders often plan on Aviation forces (attack helicopters and assault helicopters) being the combat force to respond to threat level III.

Although Aviation's contribution to RAP primarily will be to threat level III, it does have some capability to intercept threat level II incursions. Security is one of the inherent cavalry missions and Aviation will often be tasked to perform rear area security. Much like Navy reconnaissance aircraft providing early warning around a task force, cavalry forces can screen around a stationary or moving rear area (figure 3, page 14).

The cavalry scouts will be able to intercept incoming enemy air assault aircraft, amphibious insertions, vehicular movement, and in many cases, small patrols.[14] Every effort should be made to defeat enemy forces while they are still en route, in the air or on the landing site. Once landed and dispersed they pose a much greater threat to friendly forces.[15] The cavalry has antivehicle and antipersonnel capabilities now with its attack helicopters and will soon have an improved antihelicopter capability with the air-to-air Stinger. In the event of a major enemy drive to the rear area, the cavalry should be able to call on field artillery, air defense artillery, close air support, attack helicopter battalions, and the air assault capability of the combat Aviation companies to aid in the destruction of the rear area threat. Often there will be corps Aviation assets available for just such a contingency.[16] The cavalry commander should also have communications with the airborne warning and control system to permit him to direct ground maneuver forces, air assault forces and attack helicopter battalions to enemy airborne drop zones.

Aviation's contribution to ADC is primarily a reactionary one. Assault helicopters can serve as temporary command and control facilities to assist in reestablishing communications, perform medevac missions and move in Engineer support. Cavalry forces can quickly assess the extent of the damage and ascertain which routes are available for vehicles bringing forward Engineer support. Medium lift helicopters can quickly emplace temporary bridges thereby avoiding congested and uncertain road networks.

The defensive operations are not mutually exclusive. Several of them will be conducted simultaneously, resulting in the increased importance of command, control and communications. As more Army Aviation converts to the combat Aviation brigade structure, we will be required to have the tactical competence to plan and conduct operations in every possible situation. A thorough knowledge of what the basic operations are, how we can contribute with Army Aviation assets and the capabilities of the other weapons systems is an absolute prerequisite.[17]

This series of articles is intended to introduce the subject, mention some of the possibilities for Army Aviation employment and to serve as a catalyst to further discussion. It is not meant to be limiting in any sense. Space precludes a complete discussion of how to conduct each of the specific operations. The emerging Aviation doctrine (field manuals) addresses the how-to-fight issues.

Although helicopters always will be limited in number, we operate very capable systems and must employ them wisely if we are to be victorious.

13. FM 100-5, page 14-4.
14. Although intuitively, the acquisition of small patrols may not seem to be possible by helicopters, we were often very successful in Vietnam doing just that.
15. FM 100-5, page 14-3.
16. FM 71-101, page 5-7.
17. As a personal recommendation for novice tacticians I think that the first texts that every aviator should be familiar with are: FM 100-5 (Aug 1982), FM 1-111 (due out in Jan 1985 as FC 1-111), FM 71-100 (Feb 1984), and FM 1-100.

Accident Aftermath: What to do when the lawyer calls

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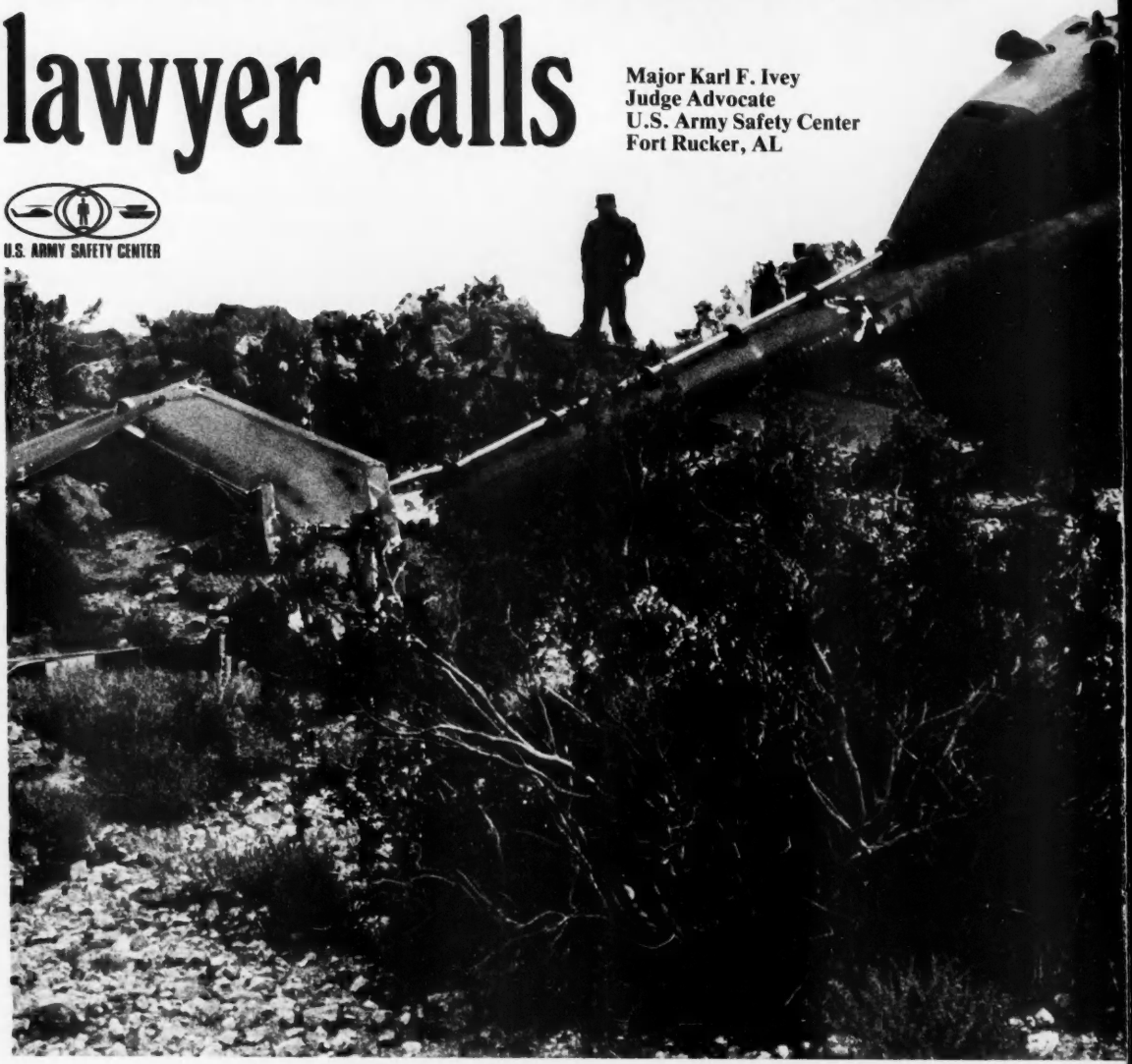
U.S. ARMY SAFETY CENTER



THE INCREASING number of lawsuits related to military aviation mishaps has led to several recent instances where accident/safety investigating officials have been asked to provide statements, depositions and courtroom testimony about their involvement in the accident investigation process and what the investigation revealed. The purpose of this article is to explain what the Army policy is concerning the questioning or testimony of accident/safety investigating officials, "expert" testimony by Army personnel, or testimony of those people who are merely witnesses to events. This article should not be considered as a substitute for specific legal advice on the issues which you, as a prospective witness, must resolve before testifying. You should always consult a judge advocate or Army civilian legal advisor for such advice.

Accident/Safety Investigating Officials and Advisors

"It is the policy of the Department of the Army that aviation safety board members not be made available under any circumstances for questioning by any party in litigation that arises out of the subject matter of their aviation safety investigation."

(Policy letter dated 27 July 1984 from Litigation Division, Judge Advocate General of the Army to U.S. Army Safety Center.)

The Army does not permit complete release of any aviation safety investigation reports, which by regulation are privileged "limited use" reports releasable within the Army only for accident prevention purposes (see AR 385-40, paragraph 1-9a). The reason for this strict control on the release of such reports is the Army's critical interest in insulating aviation safety board members from outside pressures that could affect their judgment or cause them to be less than candid in their reports. In addition, some information obtained in this investigative process is obtained only under a promise of confidentiality. If the integrity of the process is to be maintained, that confidentiality cannot be compromised.

For many of the same reasons, the Army cannot allow aviation safety board members to be questioned about their investigations. It would be virtually impossible to preclude inquiry into matters such as statements of opinion, comments, findings of accident causes, recommendations for corrective action and confidential witness statements, all of which would be exempt from release if requested under the Freedom of Information Act. If questioning of aviation safety board members were permitted, we would, in effect, be allowing the requesting parties to obtain information indirectly which they could not obtain directly, contrary to clearly established Army policy and Army regulations which govern the release of such information. (See AR 385-40, paragraph 1-7, and DOD Directive 6055.7.)

This restriction on releasing accident report data is a lifetime restriction. If former investigators are suspected of a breach of privileged data they can be investigated by the Inspector General even though they are no

longer in federal employment. (See AR 600-50, chapter 5.) If the Inspector General finds there has been a violation of the Standards of Conduct, the Secretary of the Army can impose sanctions against the violator (such as restriction from entering Army installations or other restrictions). Anyone who profits by such a conflict of interest violation (i.e., is paid expert witness fees for testifying) may have court action taken against them through the Department of Justice by the Department of the Army for forfeiture of their ill-gotten gains.

"The Army does not permit complete release of any aviation safety investigation reports, which by regulation are privileged 'limited use' reports releasable within the Army only for accident prevention purposes."

Since many investigators may be living in, or assigned to, other locations away from the location of the accident when the request for testimony or questioning is first made, it is imperative that they refuse to make any statements without first consulting the nearest Army judge advocate or Army civilian legal advisor. That legal counsel should contact the Judge Advocate of the U.S. Army Safety Center (AV 558-3819/3005 or FTS 533-3819/3005). The Army lawyers will handle the matter for the safety investigator or board member/advisor in accordance with the procedures of AR 27-40.

These requirements **do not** apply to those people who are appointed to conduct "boards of investigation" or other MACOM or corps-directed safety investigations. Such investigations do not result in "limited use" investigation reports. Aircraft accident investigations and Safety Center ground accident investigations are the most common types of limited use investigation reports. For investigations where "general use" investigation reports are prepared, safety officials or board members should follow the procedures described below in testifying about information concerning the conduct of Army activities and information received pursuant to official duties.

Expert Witnesses for Private Litigation

"It is the policy of the Department of the Army to maintain strict impartiality in private litigation. It is for this reason that AR 27-40, paragraph 7-17, generally prohibits military personnel and civilian employees from appearing as expert witnesses in private litigation. This prohibition is strictly applied in cases where the expert testimony sought involves knowledge and expertise acquired in the performance of duties pursuant to or in support of an official investigation of any type." (Policy letter dated 27 July 1984 from Litigation Division, Judge Advocate General of the Army to U.S. Army Aviation Center.)

"Some information obtained in the investigative process is obtained only under a promise of confidentiality. If the integrity of the process is to be maintained, that confidentiality cannot be compromised."

Private litigation is a court action or lawsuit in which the U.S. Army or the U.S. Government is not a party and has no direct or indirect interest in the outcome of the court case. For the reasons explained in the next paragraph, there is much private litigation following Army fatal and disabling injury mishaps. Since many Army aircraft and much equipment is unique or is not commonly present in the civilian community, it can be expected that attorneys for either side in private litigation will seek out aviators, maintenance personnel, or others in the military services to testify about the equipment involved in an accident or to testify about some technical procedure at issue in the private litigation.

"It is the policy of the Department of the Army to maintain strict impartiality in private litigation."

It should be noted that any litigation following a military aviation accident usually involves the servicemember or his/her survivors filing a lawsuit against the manufacturer of the aircraft or of a component. This is because of the U.S. Supreme Court's ruling in December 1950 in the case of *Feres v. U.S.* That decision established that servicemembers or their surviving family members cannot sue the U.S. Government for injuries received or for death of the servicemember which was

"incident to military service," even though there is clear negligence on the part of some government official or Army member.

If you are contacted to give testimony as an expert you should refuse to make any statement except that appropriate clearance must be obtained from the Office of the Judge Advocate General, Headquarters, Department of the Army. You should refer the request through your supervisors and commander to your installation legal advisor or judge advocate for resolution of the request.

After leaving the military service or federal employment there is generally no restriction on testifying as an expert witness so long as you did not act for the U.S. Government in those matters and you are not using "insider" information. AR 600-50 contains most of the conflict of interest prohibitions and should be consulted prior to your departure from your last position in the military or as an employee of the U.S. Government.

Military Personnel and Civilian Employees Who Witness an Accident or an Event in Litigation

The appearance of military personnel and civilian employees in private litigation, or for questioning or interviewing by a litigant's attorney, is solely a personal matter between the prospective witness and the litigant's attorney who requests them, subject to the approval of the individual's commanding officer or supervisor. (See AR 27-40, paragraph 7-12.) If for personal reasons the military servicemember or civilian employee does not want to be interviewed, or to testify, he or she must be counselled by the installation's judge advocate or legal advisor on the legal consequences of any refusal. The use of a deposition (sworn testimony not in court but with all litigants' attorneys present) is encouraged since this procedure helps to minimize interference with the witness' performance of duties.

Obviously many people who witness an event have factual information, based on their personal observations, about an accident. Generally there is no restriction against testimony by these witnesses. You may not testify or be interviewed without Department of the Army approval if it appears that (1) the testimony/interview will concern the manner in which Army or unit activities were conducted, or (2) information exempt from release to the public is sought, or (3) information is sought which was acquired in the performance of your official duties. (See AR 27-40, paragraph 7-17c.) In any case, you are never wrong in seeking the advice of your judge advocate or Army civilian legal advisor on the propriety of your testifying or being interviewed by a lawyer concerning an Army accident.

Some Final Considerations

As citizens each of us has a moral obligation and a responsibility to truthfully present facts and come forward with information so that justice can prevail. On the other hand, if for personal reasons you do not want to give testimony in a court case, there may be legal or regulatory authority to support your desire not to testify. Legal counselling can dispel some of the fears that you may have and may indicate to you that in the end you may still be forced to testify by a court order. If you do have to testify there are many circumstances in which you may have an Army legal representative present while you are testifying and you may travel to the trial in a duty status. (See AR 27-40, chapter 7.) After seeking legal advice both you and your superiors will be in a good position to determine if your testimony is warranted.

About the Author

Major Karl F. Ivey graduated from the United States Military Academy at West Point in 1969 with a B.S. degree in engineering. He completed law school at Memphis State University in 1976 and is a member of the Tennessee Bar Association and the Lawyer-Pilot Bar Association.

Major Ivey has served as Judge Advocate of the Army Safety Center since September 1982. His prior assignments included Defense Counsel/Legal Assistance Officer, 1st Armored Division, in Germany; Deputy Judge Advocate at SHAPE, Belgium; and as the Chief Trial Counsel, 101st Airborne Division (Air Assault.)

Prior to attending law school, Major Ivey served in Vietnam with the 173d Airborne Brigade and in CONUS with the 82d Airborne Division. He has been awarded the Ranger Tab, Parachute Badge, and Air Assault Badge.

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The Army Microwave Landing System

SOMETIME AROUND the late 1950s it was discovered that the national instrument landing system (ILS) had some significant shortcomings and should be replaced. For a few of you who can remember back that far, that was when the now classic '56 Ford and '57 Chevy were new cars! Planning was begun to replace the ILS with a microwave landing system (MLS). You don't need a home computer to figure out that this began almost three decades ago.

An article announcing the MLS appeared in this magazine in September 1976. It optimistically said, "The first MLS systems are expected to go into operation in 1978." Glad I didn't hold my breath. The good news is that the MLS may yet get off the ground, if you'll pardon the pun. There may be some bad news too; but for that you must read on.

What Is Wrong With The ILS?

So what is wrong with the national ILS system? After all, it has been demonstrated that some commercial carriers can actually conduct a zero-zero approach to the ground using the ILS. Not bad for a system that has been around longer than many Army aviators have been alive. Well, for starters there is no tactical version of the ILS. The only tactical precision approach system in the Army inventory is the tactical ground controlled approach (GCA) radar. Using a GCA radar is the only way to conduct a precision approach in the field. Problems with tactical GCA equipment are considerable. It's large, heavy, unreliable, manpower intensive and throws out one whale of an electronic signature. Signature is a bit understated; it's more like a billboard announcing the airfield location. With no existing tactical ILS, and only GCA to provide a precision approach, the Army is fairly limited in its ability to operate tactically during poor weather.

When a commercial ILS system is used at major Army airfields there are some significant drawbacks. The approach area requires a lot of cleared real estate. An ILS works on the principle of reflected radio waves which are literally bounced off the ground in front of the transmitter.

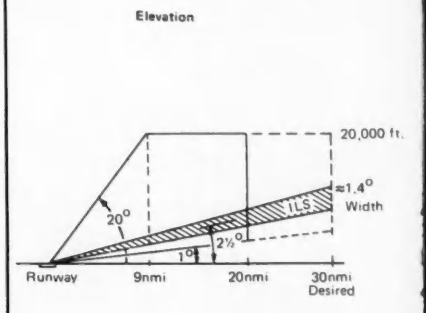


FIGURE 1

Because the ILS works at fairly low frequencies, it has sizeable wavelengths. That means a lot of property has to be kept clear to ensure an accurate signal. In many cases, it is simply impractical to clear the terrain.

The ILS is limited to a single approach path and glide slope. There is only one specific heading azimuth or localizer path and one specific glide slope. An aviator cannot change the heading azimuth or the angle of the glide slope (figure 1). What that really means is, for practical purposes, only one aircraft can use the ILS at a time. If you have ever made an ILS approach at one of the larger airports you may remember a plea to keep your airspeed because there was a stack of faster aircraft right behind you waiting their turns. The MLS can accommodate the full range of aircraft types (figure 2, page 22).

What Will MLS Do?

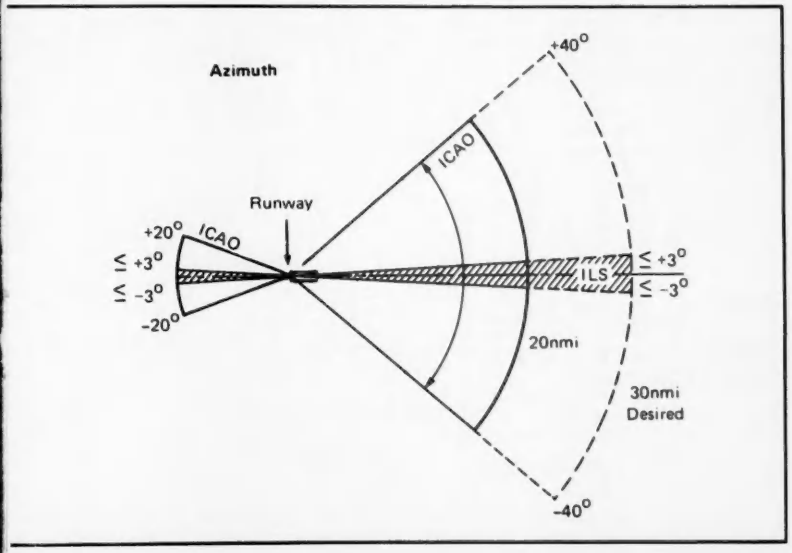
How then, will the MLS solve all those problems? First, and most important for the Army, the national MLS will have a tactical little brother. A smaller version of the fixed base MLS will be developed for use in the field (figure 3, page 22). That means you will be able to conduct a tactical precision approach using the same aircraft equipment you will use to practice at your home airfield. Furthermore, the tactical MLS ground equipment probably will tip the scale at about 400 pounds, considerably lighter than the GCA system which is well over a ton and often takes hours to set up.

The tactical MLS is not exactly manportable; but it will be a whole lot easier to move around and operate than a GCA. Not only that, but you also won't need a dedicated operator sitting behind a screen to talk you down. That has a lot of advantages in a tactical environment. From the aviator's seat there will not be much difference between conducting an MLS approach or an ILS approach. The idea will still be to keep the cross hairs in the course deviation indicator (CDI) centered and that's about it. You will, however, have some remarkable options with MLS that you don't have with the ILS.

First, you will be able to choose a number of approach courses. Right now it is expected that choices will range anywhere from 10 to 60 degrees from centerline. Eventually the choice may actually include the entire compass rose. For example, if the active runway is 27, you won't be limited to using that as the approach course for the conduct of an MLS approach. One aircraft can initiate an approach to 250 degrees while another initiates an approach to 290 degrees. There are several reasons why that is a convenient and practical choice for a pilot to have. If the prevailing winds are particularly heavy, it may be safer to choose a different approach course than that of the active runway heading. More importantly, several aircraft can begin an approach simultaneously using different approach directions. Obviously the timing of who will reach the runway first is important. You certainly don't want three aircraft to reach the numbers at the same time; but, that can be regulated using approach radar or timing.

Segmented approaches can be conducted. Accordingly, a certain part of the approach may be conducted on one course, then changed to another course. That gives air traffic control (ATC) tremendous flexibility, yet it will not lessen the precision part of the approach.

The other major choice you will have with MLS is a choice of glide slope angles. Pilots will no longer be limited to the single, predetermined glide slope angle of an ILS. You can dial in any approach angle from 1 up to at least 20 degrees. That means an approach can be tailored to meet the exact needs of a specific aircraft or airfield. A choice of glide slope angles is particularly desirable for tactical approaches. High angle precision approaches into a confined area will be possible. Not only that, but they can be set up in minutes rather than hours. The MLS will also have the use of some 200 channels, instead of the 40 now dedicated to the ILS and it will provide greater accuracy while being considerably more reliable.



The Army Microwave Landing System

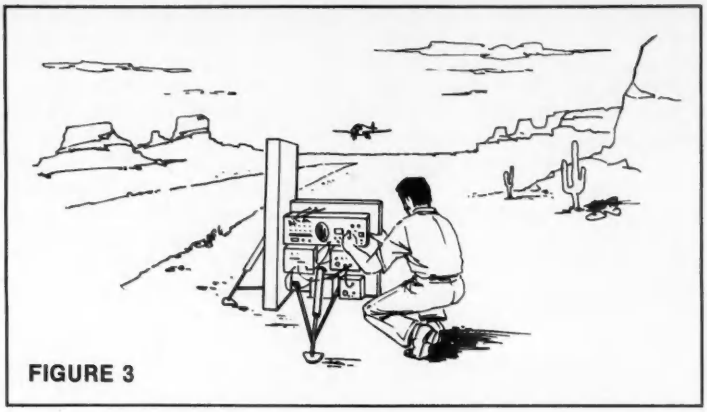


FIGURE 3

What the MLS signals look like from a birdseye view is something resembling a stack of building blocks or perhaps a stack of windows (figure 4). The pilot can choose any of the windows from which to make the approach. Obviously, the ATC facility also can tell the aviator what angle and approach heading to dial. Potentially, numerous aircraft can begin approaches without extensive holding. Timing aircraft arrival at the approach end of the runway may require some unique procedural workout, but that's what computers are all about.

Although the pilot will be able to choose the glide slope angle and approach heading, there will be combinations at some locations which are not safe. For those, the MLS will automatically flag the indicator thus telling the aviator the combination chosen is not safe (figure 5, page 24). If the MLS is expanded to cover the entire compass rose, there will no longer be any "back course" approaches. Now, that is something most aviators can appreciate! That also means that precision approaches can be performed to any existing runway. Eventually this may revolutionize the way in which approach plates are developed and produced. Even small, lightly used airfields can have several precision approaches. Producing a separate approach plate for each of them could result in something like the Encyclopedia Brittanica!

Before MLS

The story of the MLS is a fascinating journey through the world of compromise, delays and controversy. As is the case with many major Federal procurement programs, MLS has been buffeted by numerous political winds. If you follow the development of the MLS, it becomes obvious that the tactical version of the MLS is really an adaptation of the civil version. That means that the Army is taking what is really a civilian system and adapting it for military purposes.

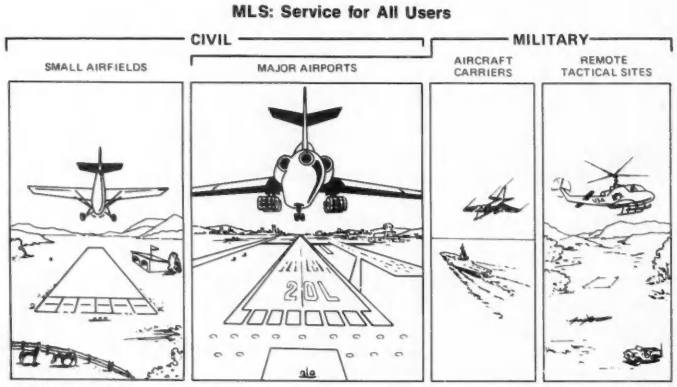


FIGURE 2

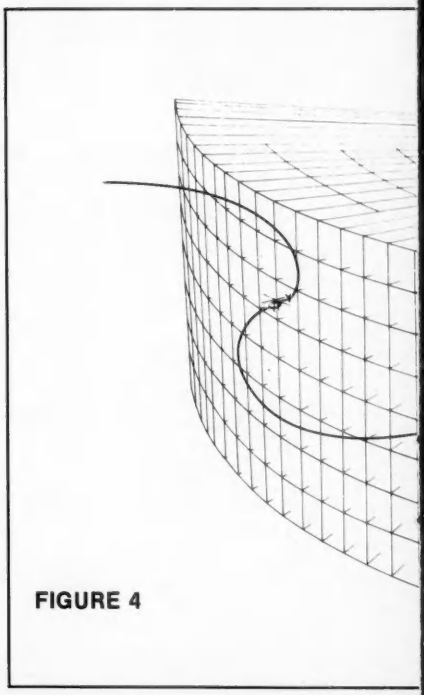


FIGURE 4

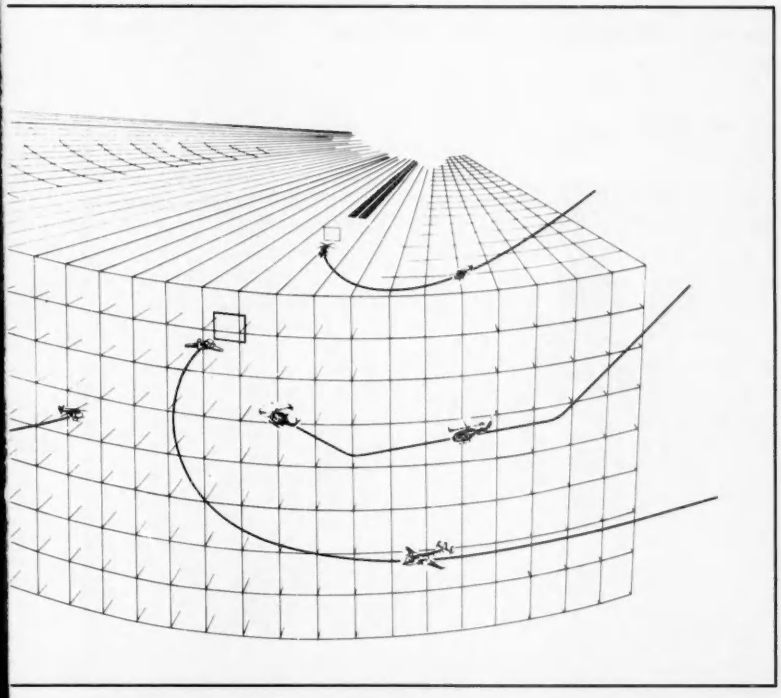
The need for a highly portable precision approach system to replace the unreliable and bulky GCA radar was recognized many years ago. Out of the recognized need was born something called the tactical landing system (TLS) which was designed and built specifically for Army use. It is a small, highly portable microwave landing system. The TLS uses a frequency band called the K_u band which is a relatively high waveband in the microwave range. The reason for choosing that frequency band is because it allows for very small antennas, and therefore results in the production of a very small ground system. The K_u band also provides very accurate distance to station information.

So accurate is the distance information provided by using the K_u band, that the system can even prompt the pilot to begin a deceleration so as to arrive at the point of landing with zero groundspeed. That capability is nice to have if you don't want to break out of the clouds right above your confined area still doing 90 knots. Unfortunately, there were some drawbacks which eventually resulted in the system being dropped. First, it can't use the Federal MLS system because it doesn't use the same frequencies. Therefore, if the Army bought the TLS for the entire fleet, aircraft flying the Federal airway system would need to be equipped with two ILS receivers, one for airfield use and one for tactical use. That would be not only inefficient but also very expensive. Fortunately, all of the development and engineering which took place creating the TLS did not go to waste. The Space Shuttle carries Army developed avionics to guide it for landing.

When the national MLS system was being designed, a decision was made to use the C band frequency range for the localizer and glide slope. The C band, because it's a bit lower in frequency than the K_u band, does not lose the signal as quickly and has much better range. Obviously that is good! Unfortunately, there is also a drawback. By using the lower frequency range the transmitter grows proportionately in size. That means an MLS using C band frequencies is no longer a manportable system. Suddenly one of the most desirable characteristics of a tactical MLS, the small, compact size, was gone.

Meanwhile, the Marine Corps has developed a system called the Marine Remote Area Approach and Landing System (MRAALS). The MRAALS is a tactical MLS which uses the K_u and L band frequencies. It is a relatively lightweight system and has the distinct advantage of having already been produced. Thus all the development costs have previously been paid and the ground system is in production, ready for fielding now. Sounds great again with but one drawback: The aircraft receiver being developed for the MRAALS is somthing called the multimode receiver (MMR).

The MMR is to be a receiver which will allow the user to use the MRAALS as well as the projected national MLS system. That is supposed to be the answer to a most difficult problem, how to build an optimal tactical MLS, yet also be able to use the national landing system with the same receiver. The MMR, which is still in development today, turned out to be a real technical challenge. It seems that the MMR can also solve the Army's problem of having an optimized TLS which is interoperable with the national landing system. Unfortunately the MMR is turning out to be an expensive alternative. The MMR is probably going to be at least three times as expensive as the receiver planned for the national MLS. Multiply that cost escalation times the thousands of Army aircraft which must be equipped with an MLS and that difference becomes a whole lot more significant.



The Army Microwave Landing System

As it turned out, the decision on which way to go was made for the Army in January 1983. Guidance from the Deputy Secretary of Defense told the services that the national MLS was going to be the standard for all of the services. That simply means that the Army must develop a tactical derivative of the national MLS. The reasons for the decision are pretty clear. It is expected that the development and fielding of a national MLS for all users of the airspace, military and civilian, will cost the Federal Government in excess of 3 billion dollars. For that kind of money, the full support of the services is required if the system is to be a worthwhile investment.

The only exception to the Defense Department guidance is the MRAALS and MMR which will continue to be developed for the Marine Corps.

Even with the full support of all the services the national MLS is still not out of the woods. It will require extensive funding from Congress during the next few years. There has been some significant reluctance from the civil side of the aviation community to accept the national MLS. Although it promises to do a lot of things for a lot of users, it will also require the installation of yet another airborne receiver. At a time when the scheduled airlines are in some financial difficulty, the idea of another fairly expensive avionics system is not greeted with much delight. Full support of the services is also not totally assured. After all, if the Army is gong to invest in the MLS then the money must come from somewhere. Someone has to decide what Army Aviation can do without to get the MLS. Nothing comes for free, and to buy thousands of airborne receivers for Army aircraft will certainly mean a reduction in some other program. The problem of deciding what is necessary and what is luxury is a challenging dilemma and certainly when operating on a limited budget those decisions do not come easily.

Army Microwave Landing System Fielding Schedule

Even if the Army fully funds the MLS program, not all Army aircraft will be equipped with the MLS. The proposed plan calls for the purchase of 4,425 airborne receivers. Since the Army has more than twice that many aircraft it doesn't take much figuring to see that half of you won't see one in your aircraft. Some 124 tactical ground systems are planned, some of which will be installed at fixed base facilities overseas. Army bases in the United States will get a civilian version of the MLS for their landing system. The installation of the MLS at fixed bases will be followed by the retirement of the GCA radars.

Again, it doesn't take much figuring to see that if only one-half of the fleet will get MLS receivers, and the GCA is gone, then one-half of the fleet will not be able to perform a precision approach. That sounds like bad news, and it is. The hope is that other advances in navigational equipment may take the edge off that deficiency. Plans now project the logistic, medical evacuation and SEMA (special electronic mission aircraft) to get the MLS. Projected schedules are for avionics systems to be purchased starting in fiscal year (FY) 1988 with the last ones to be bought in FY 1993. There is plenty of reason to believe that the schedule may be a bit optimistic. At this writing no actual hardware has been built. With no prototype hardware in 1984, yet hoping to field a system by FY 1988, is extreme optimism in the world of research and development. Obviously don't look for an MLS in your cockpit for some time yet.

And that is the story of MLS. It is a story without a conclusion because change has become the only certainty in the program. In the meantime, don't forget to practice a few GCAs now and then.

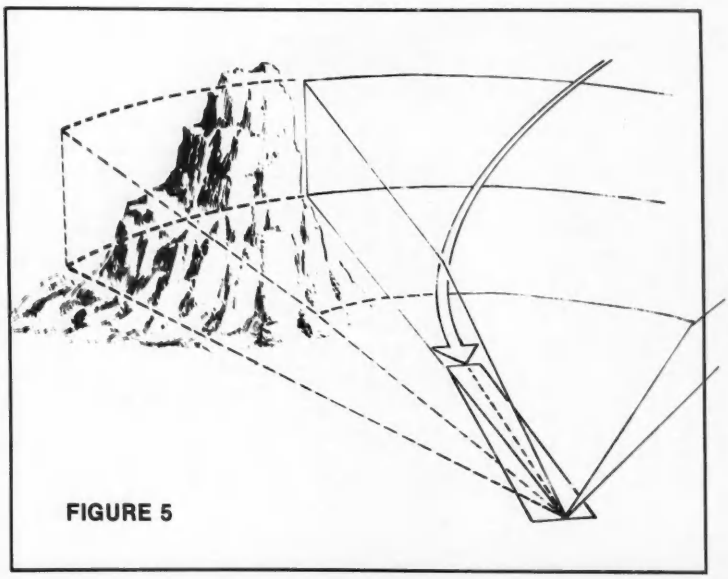


FIGURE 5

Missed Approach Point to Safe Landing

CW3 Clark J. Wilson
Directorate of Evaluation and Standardization
U.S. Army Aviation Center
Fort Rucker, AL

MOST AVIATORS ARE trained in and routinely practice instrument approach procedures. The transitions from en route navigation to instrument letdown and missed approach are clearly defined procedures and are highly standardized. Human limitations, instruments and equipment control the height above the airfield to which an aircraft may descend before either making a further descent and landing with visual guidance or alternately executing a missed approach procedure. It is the maneuvering between the end of the instrument approach to the landing that has resulted in aircraft accidents in the past. In training, it is difficult to simulate and practice a bad weather approach. Most Army instrument rated aviators have never flown an instrument approach to a landing in near-minimum weather. The novice instrument pilot often finds himself in a very unfamiliar situation upon reaching the missed approach point in marginal weather.

The transition from instrument flight to visual flight requires a rapid orientation (usually with poor visual cues) and maneuvering safely to a landing; this is a task too many aviators have had to master on their own. Pilots need to understand the potential hazards involved in making all types of approaches-to-landings in actual marginal weather.

The following two fixed wing accidents are typical examples of how things can go wrong during a circling approach. In these instances, the aircraft were transitioning from an instrument approach to one runway to make a landing on a different runway:

Case 1: The aircraft was executing a circling approach in visual meteorological conditions (VMC). The tower noted the aircraft was in close on the downwind portion. A steep turn to final was initiated, which resulted in a stall. Three died in the crash.

Case 2: The aircraft circled in VMC and rolled out on final about three-quarters of a mile from the end of the runway, at circling minimums. The pilot lowered the nose, and flew a 10 degree glide slope in order to avoid

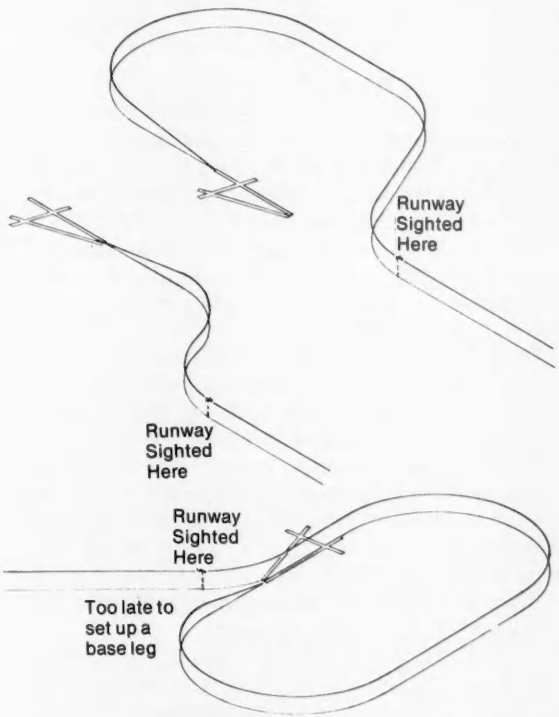


FIGURE 1: The circling approach.

overshooting the runway. The force of the landing collapsed the landing gear, and resulted in a major accident.

In these aircraft accidents, pilots transitioned from instrument flight to visual flight, and then set up a landing pattern that differed considerably from what they were used to flying. Coping with the unfamiliar, the pilots got into trouble. This much is clear: A circling approach is a potentially hazardous maneuver, and should not be attempted in actual low ceiling/poor visibility situations, unless the pilot is proficient and understands the pitfalls.

A circling approach should be flown above the circling minimum altitude if visibility and ceiling permit. Practice these maneuvers in visual conditions, reducing altitude as proficiency increases. Manage *actual* bad weather approaches so you can land from a straight-in approach whenever possible.

Consider the common problems which can lead to accidents:

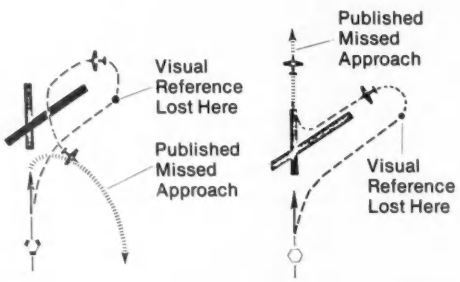
• **Overshoots:** The pilot flying an approach is likely to see the runway at a shallower angle than he is accustomed to, because the circling approach altitude is usually about one-third the altitude above the ground that he is used to in a normal traffic pattern. The shallower sight picture results in a tendency to fly a downwind and base leg so close to the runway that he either overshoots the final approach or has to descend too rapidly on final, or both. This also can be caused by the pilot not anticipating the effect of the wind. A tail wind on base leg requires a longer turning radius versus a headwind or no wind.

• **Overbank:** A tendency to overbank occurs when attempting a short radius turn during the circling maneuver. Steep bank angles can place fixed wing aircraft in a stall condition, high sink rate, or both. A steep bank angle increases the wing loading which increases the stall speed. For example, an airplane which stalls at 85 KIAS (knots indicated airspeed) wings level will stall at 120 KIAS in a 60 degree bank level turn. Recovery from these conditions may not be possible before ground impact.

• **Underpower:** Higher power settings are sometimes needed in the circling maneuver. Failure to use sufficient power for the condition of flight and the resultant loss of proper airspeed can place your aircraft in the conditions of stall and high sink rate described above.

• **Wrong runway:** In a poor visibility and low altitude situation, it is easy to line up and land on the wrong runway.

FIGURE 2: Missed approach from the circling approach.



The circling maneuver is somewhat vague. Sound judgment and knowledge of the aircraft's capabilities are the criteria for a pilot to determine the exact maneuver in each instance, since airport design, aircraft position, wind, altitude and airspeed must all be considered. No hard and fast rule can be stated. When not aligned with the runway of intended landing, maneuver the shortest path to a base or downwind leg, as appropriate. Try and maneuver the airplane so that the runway you intend to land on is on your side of the aircraft within visibility range. Usually there is no restriction from passing over the airport or other runways. One cardinal rule, however, is that the aircraft should not go below the prescribed circling altitude until the aircraft is in a position to make a normal descent for landing. While studying the approach procedure, the pilot also should study the airfield diagram to plan his maneuvering from the point he goes visual. Flying during the circling maneuver may have to be largely on instruments, visual cross-check being made to ensure orientation, position and alignment.

When the runway environment becomes visible, maneuver the airplane so that turns to base and final legs will not require steep banks (more than 45 degrees). Maintain visual contact with the runway environment while maneuvering to a proper distance for the downwind or base leg (select downwind leg distance from the

runway depending on airpseed, wind and visibility). While maneuvering, the airplane should be in the approach configuration (landing gear down, and flaps at approach setting). The airspeed should be at least Vref (velocity reference speed) + 20 knots. The point to commence the turn to final from downwind leg is best determined by timing after passing abeam the intended landing point. Assuming the visibility to be 1 mile and with an aircraft speed of 120 knots, a figure of 30 seconds should be suitable. A 180 degree medium bank turn, while maintaining altitude, will position the aircraft about in line with the runway on final (figure 1, page 25). If visual reference is lost while circling to land, the missed approach specified for that particular procedure must then be followed (unless an alternate missed approach procedure is specified by air traffic control). To become established on the prescribed missed approach course, the pilot must make an initial climbing turn toward the landing runway and continue the turn until established on the missed approach course (figure 2).

Aircraft performance has a direct effect on the airspace and visibility needed to perform circling maneuvers, turning missed approaches and final alignment corrections for landing and descent. If it is necessary to maneuver at speeds in excess of the upper limit of the speed range for the aircraft's approach category, the minimum for the next higher category should be used.

For example: A category B airplane flies an instrument approach procedure at Vref + 20 knots (aircrew training manual standards for Army fixed wing aircraft). If this speed equals 121 knots or more, category C minimums should be used to ensure that the aircraft does not maneuver outside protected airspace. A landing off the end of a straight-in instrument approach has its own hazards. The pilot will find himself from 1 mile to directly overhead the landing threshold at a height between 100 and 400 feet above the surface, about in line with the runway. The pilot must be able to rapidly orient himself with very poor visual cues, identify either the runway, or its lead-in lights and then lose altitude and speed for the landing. The airplane will be in the approach configuration (landing gear down, and flaps at approach setting). The approach speed will be Vref + 20 knots. Orientation is assisted if the aircraft is correctly aligned with the runway. If it appears that the approach is going to be made in minimum or near-minimum conditions, it is wise to request that the lights be turned up before commencing the approach.

As soon as the runway has been positively identified, the pilot will have to act quickly. Landing flaps can be lowered; it may be necessary to turn in order to achieve

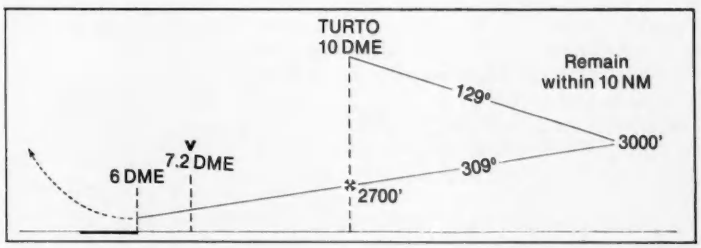


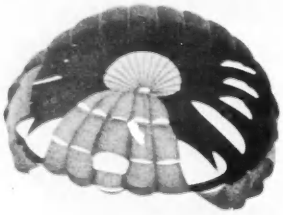
FIGURE 3: Visual descent point (VDP).

The VDP is a defined point on the final approach course of a nonprecision straight-in approach procedure from which a normal descent (approximately 3°) from the MDA to the runway touchdown point may be commenced, provided visual reference with the runway environment is established. The VDP is normally identified by DME. A 75 MHz marker may be used on those procedures where DME cannot be implemented. VDPs are not a mandatory part of the procedure, but are intended to provide additional guidance where they are implemented. A VASI lighting system is normally available at locations where VDPs are established. Where VASI is installed, the VDP and VASI glidepaths are normally coincident. No special technique is required to fly a procedure with a VDP. However, in order to be assured of the proper obstacle clearance, the pilot should not descend below the MDA before reaching the VDP and acquiring the necessary visual reference with the runway environment. The VDP is identified on the profile view of the approach chart by the symbol V.

Missed Approach Point to Safe Landing

final alignment, apply crosswind correction and complete the final landing check. Even though the pilot is visual at this point, an instrument cross-check should be maintained to touchdown in order to ensure a safe approach angle and airspeed. Avoid rates of descent greater than 500 feet per minute.

On some nonprecision approaches, a visual descent point (VDP) is given. This is the point where a 3 degree approach angle intercepts the minimum descent altitude (MDA). The pilot should not descend below the MDA even though he has the runway in sight, until he has crossed the VDP. Often there is a visual approach slope indicator (VASI), showing a correct glide slope as the aircraft descends below the MDA (figure 3, page 27). There is a tendency to land long off instrument approaches because of excessive speed, particularly if any maneuvering is required just prior to round out. If the runway is wet or icy, this will affect braking actions unfavorably and always must be considered. Until the aircraft is landed safely, a go-around must always be considered. It is easier to explain a go-around than to try to explain a damaged aircraft or worse.



Golden Knights Seek Fixed Wing Aviators

Story by Shawn Weed

ARE YOU AN Army fixed wing pilot and looking for that once in a lifetime assignment that will let you put your skills to the test all across the country?

If so, the U.S. Army Parachute Team, the "Golden Knights," may have a job waiting for you.

The Knights are the Army's only official aerial demonstration unit and travel hundreds of thousands of miles annually in their role as roving ambassadors for the Army.

"We're looking for people with a military occupational specialty of 100Q with at least 2,000 hours of fixed wing flight time including 100 hours of instrument flying time," said Captain Rudy Ribbeck, the officer in charge of the Knights' Aviation section. "The applicants should also present a proper military appearance and have a clean civilian and military record."

The Knights' Aviation section is manned by 7 pilots and 12 crewchiefs who fly and maintain the team's 5 C-7A Caribou and 2 U-21 Utes. Each year they log thousands of hours flying the world renowned jumpers across the country, as well as for the Knights' daily practice back at Fort Bragg, NC.

Those aviators who think the challenge of flying the Army's finest jumpers is for them should write to: Commander, U.S. Army Parachute Team, P.O. Box 126, Fort Bragg, NC 28307, or call 919-396-4800 (AUTOVON 236-4800).

VIEWS FROM READERS

Editor:

May I draw your readers' attention to a photograph which appeared on page 15 of the August edition of *Aviation Digest* (shown below).

This photograph, along with the accompanying caption, depicts a camouflaged 5,000 gallon fuel tanker during Team Spirit 84.

My primary reason for writing is to seriously question the concealment value provided by the camouflage. Increasingly during peacetime training, the emphasis is placed on mounting high visibility across-FLOT air assault operations to enhance the image of Aviation as a combat multiplier. The main concern for any commander should be the survivability and security of these assets, both in the air and on the ground. It is widely acknowledged that the true Achille's heel of any large helicopter operation is the vulnerability of the resupply backup. The concentration of these assets in anything other than a tactically secure and well concealed FARP raises the specter of a deliberate attack by the enemy to destroy Aviation's ability to function effectively.

During my present assignment with U.S. Army Aviation, I have frequently witnessed a lack of concern for the realities of surviving in a hostile battlefield environment. May I suggest that the theme for the 1985 training year become "Dispersion and Concealment" through "Camouflage and Deception" along with all the associated command, control and administrative difficulties when deployed in the field.

Without this resolve, I believe that in any future high to mid-intensity conflict, Aviation assets will present such a lucrative target to the enemy that life expectancy will be measured in days, and regrettably, not weeks.

CPT Ken Bailey
British Exchange Officer
Directorate of Evaluation and Standardization
Fort Rucker

For flexibility, camouflaged 5,000-gallon tankers and FARE systems were established at two locations inside the maneuver area during Team Spirit 84.

Editor:

The FM guard frequency of 40.50 MHz provides unique operational utility in that it allows for emergency communications between FM equipped ground elements and Army aircraft that routinely monitor FM guard.

Using FM guard, appropriate emergency calls to Army aircraft that happen to be in sight of or in the vicinity of the ground element can be made without prior coordination. In addition, ground elements that have been otherwise unable to contact supporting aircraft because of communications problems may be able to use the 40.50 MHz channel as a last resort to effect coordination.

Since use of the FM guard frequency is shared with few military or FAA (Federal Aviation Administration) users outside the Army, it would appear that this little used but religiously monitored frequency should be highlighted in SOPs for appropriate use by Army ground and Aviation elements.

CPT Keith E. Aakre
Standardization Officer
47th Aviation Battalion
Minnesota Army National Guard

Editor:

Request publication of the following notice in the *Aviation Digest:*

The U.S. Army Transportation and Aviation Logistics School, Ft. Eustis, VA, has announced the renumbering of Aviation doctrinal literature publications from the 55 to the 1 series. This change only applies to Aviation doctrinal literature publications. The first publications to be changed are as follows: 55-63 to 1-563
55-41 to 1-500
55-412 to 1-512

Point of contact for this section is Mr. Carl Humerickhouse, AUTOVON 927-3148.

CPT (P) Jeanette Z. Walker
U.S Army Aviation Logistics School
Ft. Eustis, VA

Articles from the *Aviation Digest* requested in these letters have been mailed. Readers can obtain copies of material printed in any issue by writing to: Editor, *U.S. Army Aviation Digest,* P.O. Drawer P, Ft. Rucker, AL 36362-5000.

Aircrew Mission Briefing Requirements

During visits to numerous Aviation units during the past 6 months, the Directorate of Evaluation and Standardization has found several units to be seriously deficient in the briefing of aircrews. Specific guidelines for aircrew mission briefings were outlined in the Vice Chief of Staff of the Army (VCSA) message 151325Z Mar 84, subject: Aviation Safety FY 84.

Under the guidelines put forth by the VCSA, each aircrew, to include those involved in single ship or single pilot missions, must be briefed prior to performing any Aviation mission. This pre-mission briefing must be given by a member of the chain of command or the operations officer. This authority cannot be delegated. In addition to the pre-mission briefing, the pilot in command is required to brief back to the mission briefer, addressing the key elements of the mission and successful mission completion considerations. This back briefing must be done prior to departing on the mission.

If we are to reduce our Aviation mishap rate, intensive chain of command involvement is needed to ensure that every mission is properly briefed, planned and executed. Aviation unit commanders at all levels must ascertain that their crews fully understand and comply with all mission briefing requirements.

Warrant Officer Mission Track and Turnaround AQC Selection

The procedures used to select warrant officer candidates (WOCs) for aeroscout or advanced aircraft qualification courses (AQC) have a significant effect on the new warrant officers' career patterns and potential assignments. These procedures also impact greatly on the units in the field that receive newly trained Army warrant officer aviators. This article will clarify the procedures used at the United States Army Aviation Center as they apply to the warrant officer candidates.

The key to the procedures is a selection algorithm. An algorithm is a set of rules for solving a problem in a finite number of steps. The problem the Aviation Center is concerned with is how can we meet the needs of the Army, while trying to increase the probability of success of the warrant officer candidates in becoming United States Army aviators.

The algorithm procedures for the warrant officer candidate combine the student's flight and academic grades through basic instruments, with the subjective evaluations of their training, advising and counseling officer, primary phase (TH-55) instructor pilot and contact phase (UH-1) instructor pilot. These subjective evaluations appraise specific individual characteristics. The flight grades are checkride grades based on flight line performance, and academic grades are based on examinations of classroom performance. Only the flight and academic grades up to and including the basic instrument checkride grade are used. This establishes a definite cutoff point for every class that can be used in the selection procedure. All of these different grades are collected and, through the use of a mathematical formula, they are converted into a single score for each warrant officer candidate.

The scores are used as a yardstick to measure an individual's potential success in the Ft. Rucker

schoolhouse environment. The correlation that exists between the algorithm and actual performance in later training is statistically significant. The algorithm score has proven to be the best tool available so far for predicting success in the aeroscout track and all the turnaround aircraft qualification courses.

It must be remembered that the algorithm is based on performance at the school and is not a predictor of performance in the field. Performance in the school is important because of the time and financial constraints placed on the Aviation Center to produce a quality product. The individual with the best chance of success in the academic environment must therefore be used to fill the quotas that are the most academically demanding.

The specific procedure used to select WOC students to attend the aeroscout track and turnaround aircraft qualification courses has recently been redesigned. The new procedure is an attempt to equally distribute the wealth of excellence across the Aviation community and to satisfy the needs of the Army within the restraints of time and money.

The first step in the new selection process is a built-in reward system. In keeping with the motto of "Building an Army of Excellence," the top 10 percent of a class (in terms of algorithm scores) is allowed to choose the aircraft they prefer to fly, from the quotas available to that class.

The next step allows the warrant officer candidate, with a strong desire to go into the attack program, the opportunity to volunteer for it. Those who have selected the aeroscout track or the AH-1 AQC as their first choice on their preference sheet fill the available quotas first. If there are more volunteers than quotas available, then the individuals with the highest algorithm scores are selected.

The next step in filling the remaining quotas is to divide them into proportionate groups based upon the aircraft categories that are available. The quotas are then filled by using the algorithm score and preference. Individuals with the highest algorithm score in each group are given their choice of the quotas available to their group. This procedure distributes the remaining talent equally across the various aircraft.

EXAMPLE

Class 86-73 is comprised of 30 warrant officer candidates. Quotas available to this particular group of students are:

10 OH-58 Aeroscout

6 AH-1 Cobra

3 UH-60 Black Hawk

3 CH-47 Chinook

Ten percent of 30 is 3. Thus, three students with the highest algorithm scores get to choose from the available aircraft quotas. For example, let us suppose that one wanted to go UH-60, one wanted to go CH-47 and one wanted to go OH-58 aeroscout. The quotas remaining are:

9 OH-58 Aeroscout

6 AH-1 Cobra

2 UH-60 Black Hawk

2 CH-47 Chinook

The references are screened to determine which warrant officer candidates have either OH-58 aeroscout track or AH-1 Cobra aircraft qualification course as their number one preference. These individuals are then slotted against the remaining quotas. For this example, three individuals have the OH-58 aeroscout track as their number one preference and two others specify the AH-1 aircraft qualification course. The quotas are now:

6 OH-58 Aeroscout

4 AH-1 Cobra

2 UH-60 Black Hawk

2 CH-47 Chinook

These remaining quotas are next broken into proportionate groups. The number of groups is dependent on the smallest quota remaining. Our example yields two groups because both the UH-60 and the CH-47 have two quotas remaining. Dividing the remaining quotas into two groups gives us the following:

GROUP 1	GROUP 2
3 OH-58 Aeroscout	3 OH-58 Aeroscout
2 AH-1 Cobra	2 AH-1 Cobra
1 UH-60 Black Hawk	1 UH-60 Black Hawk
1 CH-47 Chinook	1 CH-47 Chinook
7	7 Total Quotas Per Group

Group 1 is comprised of the top seven people remaining on the algorithm list. Group 2 is comprised of the next seven people on the list. All remaining students will complete their training in the UH-1 utility track. The WOCs in group 1 select, in descending order of their algorithm scores, aircraft training assignments they prefer based on the quotas available to the group. The same process is used for each subsequent group.

This new selection procedure rewards excellence, while meeting the needs of the Army within the confines of time and money. It is not expected to satisfy everyone's desire to fly a specific aircraft.

DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to us at: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Ft. Rucker, AL 36362-5000; or call us at AUTOVON 558-3504, FTS 533-3504 or Commercial 205-255-3504. After duty hours call Ft. Rucker Hotline, AUTOVON 558-6487 or 205-255-6487 and leave a message.

PEARL'S

Personal Equipment And Rescue/survival Lowdown

Anneliese Brown photo by Dennis Thompson

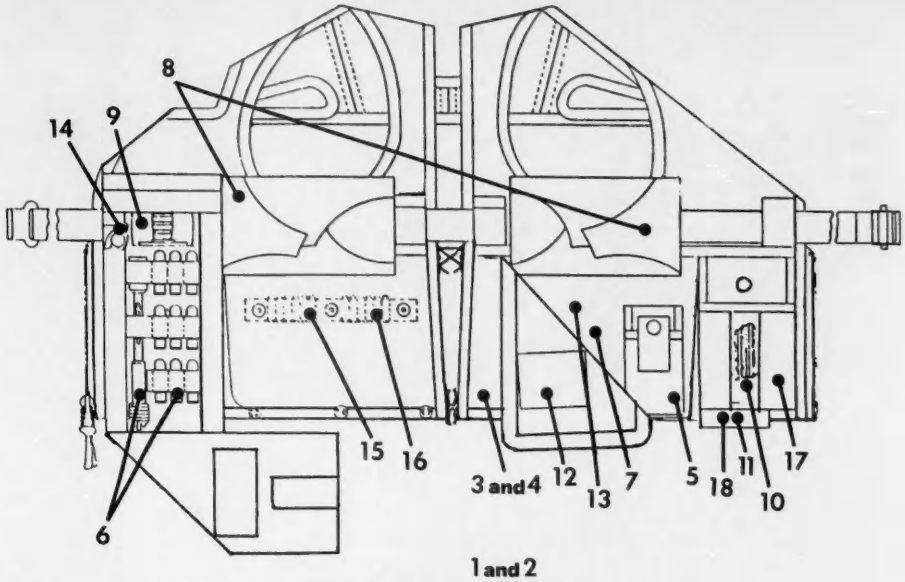
Aviation Life Support Specialist Course (ASI Q2) FY 85 Class Schedule

The following is a schedule of all ASI Q2 classes being offered at Ft. Eustis, VA, during FY 85.

Any questions regarding these classes or procedures for obtaining an allocation for the school should be directed to CW3 Arthur Miskimon or SFC (P) Robert Jones at AUTOVON 927-2475/4462 or Commercial (804) 878-4662/2475.

CLASS NUMBER	REPORT DATE	COMPLETION DATE
1	2 Oct 84	7 Nov 84
2	16 Oct 84	21 Nov 84
3	31 Oct 84	7 Dec 84
4	31 Oct 84	7 Dec 84
5	15 Nov 84	4 Jan 85
6*	6 Jan 85	8 Feb 85
7	16 Jan 85	21 Feb 85
8	28 Jan 85	5 Mar 85
9	11 Feb 85	19 Mar 85
10	24 Feb 85	29 Mar 85
11	24 Feb 85	29 Mar 85
12	7 Mar 85	11 Apr 85
13	24 Mar 85	26 Apr 85
14	7 Apr 85	10 May 85
15	21 Apr 85	24 May 85
16	21 Apr 85	24 May 85
17	2 May 85	7 Jun 85
18	16 May 85	21 Jun 85
19*	29 May 85	3 Jul 85
20	11 Jun 85	17 Jul 85
21	24 Jun 85	30 Jul 85
22	24 Jun 85	30 Jul 85
23	28 Jul 85	12 Aug 85
24	21 Jul 85	23 Aug 85
25	31 Jul 85	5 Sep 85
26	31 Jul 85	5 Sep 85
27	13 Aug 85	18 Sep 85
28	26 Aug 85	1 Oct 85
29	10 Sep 85	16 Oct 85
30	10 Sep 85	16 Oct 85

*Supervisor's Course (for officers and senior enlisted personnel only)
NOTE: These courses can only hold 12 people, so get your requests in early. Your request should be submitted through your command/installation training office to MILPERCEN.



OV-1 Survival Vest Component List

1. Assembly, Small
2. Assembly, Large
3. Survival Vest, Small
4. Survival Vest, Large
5. Light Marker, Distress, SDU-5/E
6. Signal Kit, Personal, Distress
7. Survival Kit, Individual c/o General Packet and Medical Packet
8. Life Preserver, Underarm, LPU-10P
9. Knife, Sheathed, Survival Pilots
10. Knife, Pocket, Hookblade
11. Whistle, Ball, Plastic
12. Mirror, Emergency, Signaling
13. Assembly Instruction Sheet
14. Revolver, Caliber .38, Special
15. Cartridge, Caliber .38, Ball 6 each
16. Cartridge, Caliber .38, Tracer 6 each
17. Radio Set AN/PRC-90
18. Firestarter, Aviation Survival, Magnesium

NOTE: Items 14 thru 16 authorized and issued by local commander.
Item 5 requires Flash Guard P/N ACRFGIB, and Battery BA15 74/4.
Item 17 requires Battery BA 1568/4

OV-1 Survival Vest

The current configuration of the OV-1 survival vest is shown. Recommend this be copied and used in the unit's OV-1 vests. To order items contained in the vests and the vests themselves, consult SC 1680-97-CL-A07. The operator's manual for this vest is TM 55-1680-316-10, "Operator's Manual for Rigid Seat Survival Kit and Survival Vest, OV-1 Aircraft." Note that this vest is authorized for OV-1 aircrews *ONLY!*

If you have a question about personal equipment or rescue/survival gear, write PEARL, AMC Project Officer, ATTN: AMCPO-ALSE; 4300 Goodfellow Blvd., St. Louis, MO 63120-1798 or call AUTOVON 693-1218/9 or Commercial 314-263-1218/9.

MONTHLY WRITING AWARD

THREAT

Mr. Edward J. Bavaro
Threat Branch
Directorate of Combat Developments
U.S. Army Aviation Center
Fort Rucker, AL

Soviet Helicopter Armament

Twenty-eight years ago the U.S. Army began fabrication and testing helicopter armament at Ft. Rucker, AL. Since that time development of helicopter armament has improved significantly. The Soviets watched these armament developments with great interest and have probably developed weapons specifically intended for attack helicopters, thereby maximizing their overall combat effectiveness.

THE CONCEPT OF arming helicopters in the Army has had a history of fits and starts going all the way back to 1942. In 1942, the Army studied the possibilities of mounting a 20 mm cannon in the nose of a Sikorsky R-5 helicopter. Subsequent efforts included mounting a bazooka on an H-13 helicopter in 1950 and a makeshift grenade launcher, also on an H-13, in 1953. When the H-19s were deployed in Korea, the need for a ground suppression system became apparent because of their vulnerability during troop assault landings. Any genuine interest in pursuing this need, however, faded away after the Korean War ended. All of these efforts never matured because no sincere support was provided and they suffered from the lack of a formal research and development program. One of the main hurdles that had to be overcome in arming helicopters was the great weapon inaccuracy induced by helicopter instability and vibration.

The real development of helicopter armament in the U.S. Army began in 1956 at Ft. Rucker, AL, when BG Carl I. Hutton established a group to undertake a special project—the fabrication and testing of weapon systems for Army helicopters. A major consideration for this project was again the need to provide suppressive fire for assault troops. By now, the idea of airmobile operations was becoming a more attractive tactical concept within the Army. But more than that, General Hutton envisioned helicopters designed strictly as weapon systems. In July of 1956, General Wyman, commanding general, USCONARC, approved Hutton's request to experiment with airmobile concepts and to consult with industry in the development of fighting aerial vehicles. With that, the forging of the Army's "saber in the sky" was underway.

The French were the first to operate armed helicopters in combat. In the mid-1950s, during a battle with Algerian rebel forces, an enterprising French unit commander undertook to arm a helicopter. This occurred in the heart of the Aures, a group of peaks in the Atlas Mountains in Algeria, during the 8-year war the French waged with Algerian rebels. The commander's troops were pinned down by rebel fire from a hillside above their position and he could not get his ground troops into position where they could provide a base of fire before dark. The commander had an observation helicopter with two litters attached to its sides near his command post. He strapped a man with an automatic rifle in each litter and sent the helicopter up against the rebels who were routed from their position by the helicopter's fire and the French unit occupied its objective.

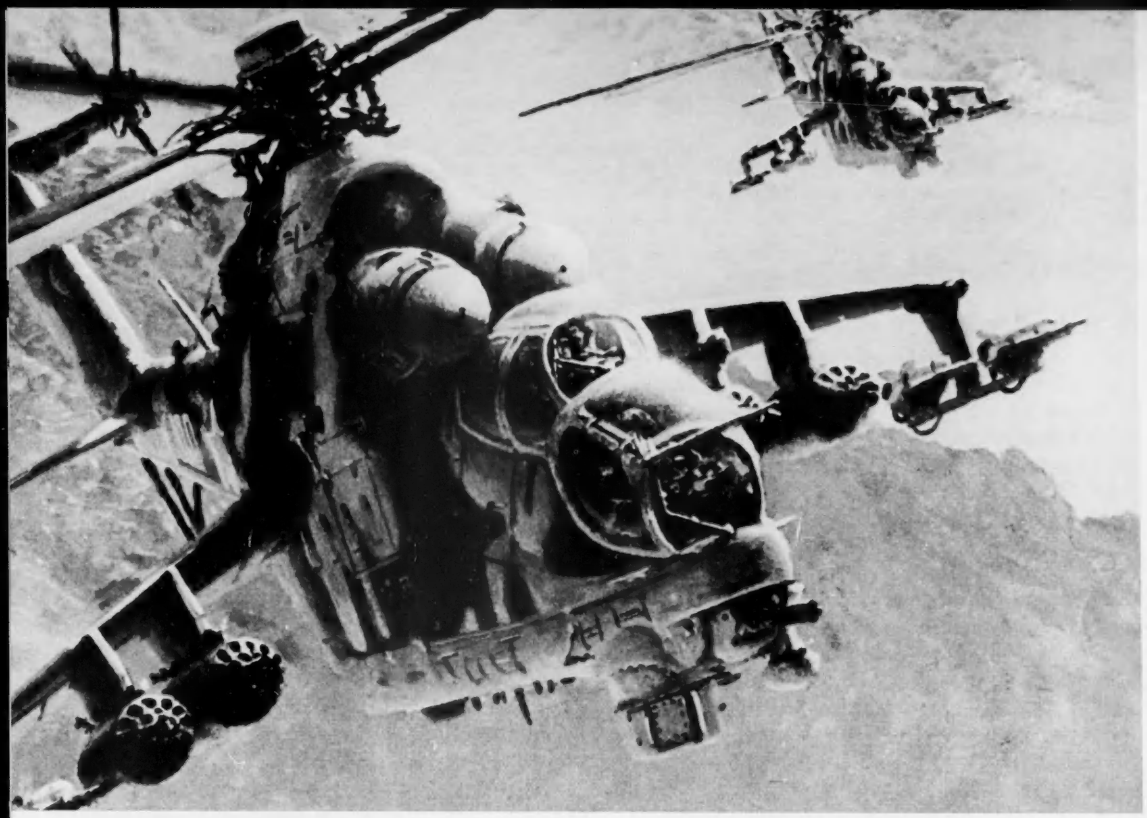


illustration by William S. Phillips

Another, more conventional armed helicopter application was devised by the French during the Algerian War. Rebels realized that after French fighter aircraft cleared helicopter landing zones (LZs) and departed, the assaulting helicopters were extremely vulnerable during their in-runs. The rebels became quite proficient at shooting the helicopter pilots during their approaches to the LZ. The French started arming helicopters to cover the assault force during the in-run and landing phase of the operation. With the arrival of H-21s in 1956, the French tried developing heavier armament systems. They experimented with .30 caliber machineguns and rocket launchers. The rockets were 37 mm, carried in various canisters holding 18, 36 or 54 rockets for each launcher.

During this same period, the French were spearheading the development of antitank missile systems. Antitank missiles don't have to depend on kinetic energy; they can use chemical energy in their shaped-charge warhead. The tank-heavy battlefield envisioned in Europe puts a premium on far-ranging antiarmor weapon systems. The French SS-10 ground-to-ground antiank missile of the early 1950s was followed with a larger, longer-ranged version called the SS-11 in 1956. An air-launched version, the AS-11, was tested on the Alouette II in 1958. A significant advantage of aerial delivery of antitank missiles is that the target presents a greater silhouette from the air than it does from ground level. More importantly, however, helicopters can engage the tanks from a variety of aspects and angles. This capability, combined with the inherent speed and response helicopters can provide, represented a new dimension for the application of combat power.

The French success encouraged and pushed our own efforts further to put firepower on Army helicopters. Experiments were conducted at various installations in the United States, but those done at Ft. Rucker were the most extensive. Many experiments were conducted by the Ft. Rucker group and in March 1957, the Aviation Center directed the organization of a Sky Cavalry Platoon (Provisional). This test unit was later reorganized by Third Army General Order, in March 1958, and redesignated as the 7292d Aerial Combat Reconnaissance (ACR) Company (Experimental). These "Sky Cav" men worked hard developing weapon systems for Army helicopters. They later expanded their work to include the development of armed helicopter employment and experimented with machineguns (.30 to .50 caliber), rockets (up to 5-inch) and various cannons. Although other installations did armament testing, the ACR Com-

pany at Ft. Rucker remained the focal point for Army testing. The Marine Corps did some armed helicopter testing but did not receive authorization to arm its helicopters until 1964.

The Soviets watched these armament developments with interest even though they were by no means convinced that the helicopter could survive on the modern battlefield. Despite that conviction, they did put machineguns on their helicopters. They mounted single-barrelled machineguns in Mi-4 Hounds and Mi-6 Hooks. However, as the concept of airmobility became viewed as a sound tactical option, the Soviets mounted "strap-on" armament packs on the lift helicopters, notably the Mi-8 Hip-Cs and Hip-Es. These packs consisted of rockets to provide suppressive fires during the assault phase of operations, capitalizing on the experience of both the French and the United States. The Soviets, as have most countries employing armed helicopters, adapted an existing helicopter to fill armed helicopter roles as they evolved their airmobility tactics.

Soviet helicopter armament has progressed from single machineguns and strap-on systems on general purpose utility helicopters to modern attack helicopters with integrated armament systems. The guns initially were 12.7 mm (Mi-4 Hound) manually trained machineguns intended for defensive purposes. By the 1970s, rotary action, remotely controlled, Gatling-type machineguns mounted in ball turrets in the chin of helicopters (such as those on the Hind) had become typical. The Hind has been observed in one variation configured with twin 23 mm cannons. While these Hinds are considered experimental and intended for testing, the Soviets are obviously giving serious thought to up-gunning their attack helicopters (the 30 mm cannon on the AH-64 Apache may have some bearing on such consideration).

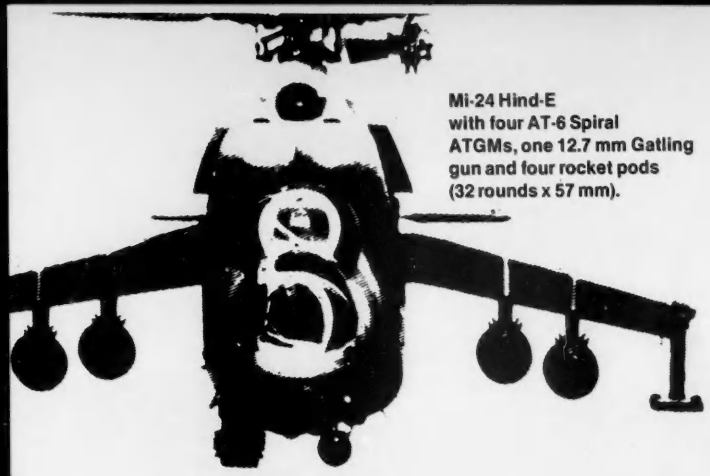
In 1969, the Soviet helicopter armament efforts included podded, folding fin, unguided rockets. Most frequently used are the 57 mm rockets in 16- or 32-shot pods. During the 1960s, Mi-4s were often observed carrying four pods of 57 mm rockets (16 x 57 mm). One facet of Soviet helicopter armament that is unique is the employment of various types of bombs. The reason is due, in part, to the fact that attack helicopters are replacing fixed wing aircraft to provide much of the close air support for ground forces. Some of that ground support includes the need to eliminate strong points and lines of communication and to rubble buildings during military operations in urban terrain. We also read quite a bit about aerial delivery of chemicals in Afghanistan. On a high intensity battlefield, the viability of helicopter bombing is questionable and would be dependent on some sort of low altitude capability to do so, such as delay-activated bombs. Nevertheless, Soviet armed helicopter units allocate part of their weapons training to bombing operations.

Mi-8 Hip with six rocket pods (32 rounds x 57 mm) and four AT-2 Swatter ATGMs.

The Soviets put great store in defeating armor—by any means available. With the advent of antitank guided missiles (ATGMs) and following the lead of the French and the United States with heliborne ATGMs, the Soviets sought to mount an improved AT-2 Swatter on their helicopters. The AT-2 has been deployed since the late 1960s on the Mi-1, Mi-2, Mi-8 and Mi-24. The Swatter is command-guided by a radio link, rather than with a wire link such as is used on the French SS-11 and the United States TOW missile. The Swatter employs semiautomatic command to line of sight (SACLOS) whereby the gunner only has to track the target with his sight. The original French SS-11 was a manual command to line of sight (MACLOS) which required optical tracking of the target and the missile. This technique (MACLOS) is such a difficult requirement that the Soviets have mobile simulators mounted in trucks to improve proficiency of their AT-3 Sagger ground crews. A MACLOS missile employed on helicopters must be a veritable bear for the gunner.

In the late 1960s, the Sagger was modified to SACLOS guidance and designated the AT-3C. The East Germans carry the Sagger on the Mi-8 Hip for their antiarmor weapon. The Soviets instead have opted for the SACLOS AT-2 Swatter and now the impressive AT-6 Spiral as their primary ATGM on helicopters.

Today, the AT-6 stands as the most prominent ATGM fielded in the world because of its range and speed. But more importantly, the AT-6 can be used in an antihelicopter air-to-air role. This answers the mail for MG Belov, the leading Russian helicopter advocate,



Mi-24 Hind-E with four AT-6 Spiral ATGMs, one 12.7 mm Gatling gun and four rocket pods (32 rounds x 57 mm).

Mi-2 Hoplite with four AT-3 Sagger ATGMs and 12.7 mm machinegun.

who stated the need to have antitank missiles that also could be used against helicopters. Hind-Es have carried the AT-6s on the inboard pylons as well as in the standard mounting location on the outboard winglets. This could be taken to mean a tailored Hind mission configuration dedicated for an antiarmor role or an antihelicopter role.

Belov is often quoted for his view that "just as tanks have been the most effective weapon against tanks, helicopters are the most effective means of fighting helicopters." There's a lot to be said for helicopter performance, but on the subject of helicopter confrontations, the issue evolves mainly around weapons and tactics. This situation is far different than that Aviation went through in the 1930s. Back then, the transition from fabric covered biplanes to sleeker, all metal monoplanes was the vogue. Then the aircraft's performance was paramount as there was no particular innovation in weaponry. Oddly enough, the Russians were the last major power to make that transition just as today they are the last major power to transition to dedicated attack helicopters. But they have arrived and with great impact.

Until the AH-64 Apache is fielded, the Hind is still rated the best attack helicopter in the world. And now we are beginning to hear more about their new Mi-28 Havoc, which may be the dedicated attack helicopter the Russian helicopter patrons have been seeking.

While most of the weapons on Soviet helicopters are off-the-shelf weapons adapted for use on helicopters, it is reasonable to anticipate the development of weapons specifically intended for attack helicopters, thereby maximizing overall system effectiveness. A noticeable shortcoming of Soviet helicopter armament is the 12.7 mm Gatling-type machinegun on the Hind. While the rate of fire is good, the 12.7 mm lacks punch compared to the various cannons found on our attack helicopters. More importantly, the limited range of about 1,000 meters means that it will be at a distinct disadvantage because our cannons reach out more than 1,500 meters. Those Hinds that have been observed with twin 23 mm cannons (GSH-23s, same as that mounted on MiG-21s) are thought to be a test unit. These 23 mm cannons are fixed forward on the starboard side of the Hind requiring the pointing of the aircraft at the target.

Armed helicopters have come a long way in the past three decades. While the acceptance of helicopters generally has been slow, today just about every major military power features a combined arms philosophy in which helicopters, particularly attack helicopters, play an important role. Weapons technology (including target acquisitions and fire control systems) is becoming a greater measure of helicopter tactical effectiveness than aeronautical engineering.

Among the challenges of technology today, one is to make the tank survivable enough to continue its traditional role in the face of ever-increasing threats from the growing family of antitank munitions. One Soviet faction contends that the helicopter and improved antiarmor munitions are rendering the tank obsolete. That contention will be reinforced with the fire and forget antitank missile which will further disadvantage the tank. As Soviet attack helicopters are increasingly forced toward antihelicopter operations, the fire and forget air-to-air Stinger portends serious problems for them.

The Soviets have their work cut out for them. They probably have gone about as far as they can in adapting other systems (especially those adapted from fixed wing systems) for attack helicopter application. The level of technology being applied to helicopters is dynamic and sophisticated and will require the Soviets to undertake risky and costly research and development—the kind they are particularly uncomfortable with. It will be interesting to see what they come up with!

the AVIATION WARRANT OFFICER and the AVIATION BRANCH

Major Robert S. Christensen
and
CW3 David L. Day
Aviation Proponency Office
U.S. Army Aviation Center
Fort Rucker, AL

SINCE BEING established as the newest combat arms branch of the Army on 12 April 1983, the Aviation Branch has had spectacular success in implementation of the branch decision and the establishment of the Aviation Commissioned Officer Basic and Advanced Courses. These efforts, as well as the very visible transfer of Aviation commissioned officers into the Aviation Branch, has caused some officers to conclude that warrant officers (WO) are not members of their basic branch but are members of a separate Warrant Officer Branch of the Army.

This conclusion is far from the truth! There is not a WO branch of the Army. All warrant officers are members of a basic branch of the Army and have received their warrants in that basic branch. It is easy to understand how this illusion occurred. In the past, assignment officers at the Military Personnel Center (MILPERCEN) were grouped according to their basic branches. The common terminology used when referring to these assignment officers was "Armor Branch, Infantry Branch," or in the case of warrant officers, "Warrant Officer Branch."

This misconception of branch affiliation was evident in the survey conducted during the Training and Doctrine Command (TRADOC) Review of Army Aviation (TROAA). During the establishment of the Aviation Branch, this issue was brought to the forefront. One of the initiatives of the TRADOC Aviation Branch Implementation Plan was the recommendation that all warrant officers be allowed to wear the insignia of their branch and that warrant officers be managed by their basic branches within MILPERCEN. This proposal was considered, but a decision was deferred.

For this reason, Aviation warrant officers (AWOs) who were branched into Aviation at the time they received their warrants continue to wear the warrant officer insignia. Meanwhile, the Aviation commissioned officers have been transferred into the Aviation Branch with the Aviation warrant officers, who have, basically, always been in the branch.

The visible difference in insignia worn by commissioned officers in the Aviation Branch has caused some warrant officers to conclude that the Aviation Branch is for commissioned officers only. This also is far from the truth. The Aviation Branch includes commissioned officers, warrant officers and enlisted soldiers. The fact of the matter is that commissioned and warrant officers combined make up only 42 percent of the Aviation Branch, while enlisted soldiers make up the other 58 percent.

The Aviation Branch accomplished a superior effort to start its commissioned officer basic and advanced

courses at Ft. Rucker, AL. The outstanding success in developing and implementing these courses using existing resources and completing the task well ahead of schedule has been highly publicized. This publicity has caused some warrant officers to interpret this to mean that the Aviation Branch is only interested in its commissioned officers.

This is, of course, *not* the case. Just as warrant officers have been in the Aviation Branch, the warrant officer entry, advanced and senior courses have been in place for some time. It is only the Aviation commissioned officers who have had to borrow their tactical and professional training from other branches of the Army. The tremendous void in Aviation doctrinal and tactical development mandated establishment of these courses as soon as possible.

Even during this major endeavor to establish commissioned officer courses at Ft. Rucker, the warrant officer training program has not been neglected. The Warrant Officer Candidate Development Course has been revised and standardized throughout the Army. Now designated as the Warrant Officer Entry Course, it plus branch functional training/certification must be completed by all personnel prior to their appointments as warrant officers. Increased tactical and professional training provided in the Initial Entry Rotary Wing Course is provided to both commissioned and warrant officer students.

The Aviation Warrant Officer Advanced Course (AWOAC) has been revised to increase the amount of combined arms tactics taught. Also, the frequency of the course has been increased to allow more AWOs to attend in residence. It is the goal of the Aviation Branch to have all AWOs complete the AWOAC, either in residence or by correspondence, prior to promotion to CW3.

The Warrant Officer Senior Course has been revised to be completed in 19 weeks. Instead of two extremely large classes, there now are 10 classes of between 30 and 35 students conducted each year. This increases, by 100, the total number of WOs who will attend resident training each year.

Since 1979, 85 percent of all Aviation commissioned officers have been directly accessed from either the Military Academy, Reserve Officer Training Corps or Officers Candidate School. This has allowed these officers to spend a much greater amount of time in Aviation units and they have become more tactically and technically proficient in the employment of Army Aviation in the combined arms arena. This exclusive Aviation oriented tasking, while increasing Aviation expertise will also save the Army substantial monies. The required number of Aviation commissioned officers that have to be trained is decreased because new aviators will work in the Aviation Branch and not have to shuttle between Aviation and other branch assignments as before.

Increased Aviation employment and improved Aviation training will provide Aviation commissioned officers who are professionally prepared to lead Aviation organizations. As this change occurs, many warrant officers perceive a declining role for the warrant officer in Aviation.

The role of the AWOs is not declining, but it is changing. AWOs are not merely technicians, but are in fact combat arms officers who must be technically and tactically proficient in order to operate as members of the combined arms team. As the Army adopts the Army of Excellence force structure, the Aviation warrant officer will be given even greater responsibility to include serving as section leaders within table of organization and equipment (TOE) units.

Likewise, a base table of distribution and allowances (TDA) is being developed to provide a standard Army airfield structure. Aviator positions in these flight detachments will be manned by AWOs, except for the positions of the commander and operations officer and those positions identified for Department of the Army civilians. This proposal will allow commissioned aviators to spend a greater amount of time leading and commanding in TOE Aviation units and it will provide positions of greater responsibility within TDA units for Aviation warrant officers.

A proposal to grade AWO positions has been developed by Ft. Rucker and this proposal has been forwarded to the Department of the Army (DA) for further staffing. In addition to this proposal, 13 AWO career development initiatives have been sent to Warrant Officer Division for inclusion in the DA Officer Personnel Management Study. The total warrant officer study group will consider these proposals along with all aspects of the warrant officer corps.

Army Aviation is in transition to meet the AirLand Battlefield requirements of today and the future. New tactical and logistical doctrine is being formulated; new aircraft and Aviation systems equipment are being fielded; and Aviation organizations are being renovated to enhance efficiency. Similarly, the role of the Aviation warrant officer is expanding and changing. However, the change can only be viewed as a positive step forward. The bottom line is, the role of the Aviation warrant officer is evolving into opportunities for greater responsibility and utility than ever before. The challenge to all of us in the Aviation Branch is to prove worthy of our opportunities and responsibilities.

AIR FORCE AIR GROUND OPERATIONS SCHOOL

The U.S. Air Force offers a 6-week course that focuses on training in joint tactics and air/ground operations to Active Army, Reserve, National Guard and designated service school personnel. Graduates of the course are awarded additional skill identifier 5U, ASI 5U and ASI Q8. You can learn more about this course and its relation to the AirLand Battle concept by reading the following article.

AIRLAND BATTLE is a phrase heard from platoon to corps level. Instructors at each Army school define, explain and expand the concept of the AirLand Battle. Virtually every branch magazine has published articles detailing how that particular branch will fight and function in the context of the AirLand Battle. Each of these articles appears to have a common thread, a thread basic to the concept itself: If we are going to win the battle it is absolutely necessary for all of the services—Army, Navy, Air Force and Marine Corps—to function as a team. This requires that each service's personnel understand the other services' functions, organizations and capabilities and we must know how to integrate all facets of the AirLand Battle. Other than on-the-job training, where can one go to receive training in joint operations?

The United States Air Force Air Ground Operations School (USAFAGOS), located at Hurlburt Field, near Ft. Walton Beach FL, is the focal point for joint training in tactical air-ground operations. It is the only school that is authorized to train Army officers and enlisted members for award of the additional skill identifiers (ASIs) that pertain directly to AirLand operations (5U—Air Operations Officer; Q8—Tactical Air Operations Specialist).

Although it is an Air Force school, the Air Ground Operations School (AGOS) has a strong joint service flavor. The U.S. Army element, headed by a colonel who is also a deputy commandant, includes nine staff and faculty members who provide instruction in ground operations, intelligence, communications, Air Defense Artillery, Field Artillery and Army Aviation subjects. The AGOS faculty also includes U.S. Navy and Marine Corps personnel who serve as advisors to the commandant and instruct the Navy and Marine Corps portions of the curriculum.

A unique institution, AGOS is charged with the responsibility for training personnel in the doctrine, control system, tactics, techniques and procedures by which component air and surface combat forces plan, integrate and conduct joint operations. To accomplish this, the school conducts two courses: The Battle Staff Course (BSC) and the Joint Firepower Control Course (JFCC). These courses span a wide range of topics in joint operations from concepts, procedures and techniques of combat operations to battle management decision processes by component and joint force commanders.

Battle Staff Course

The BSC is a 3-week course which provides a fundamental understanding of tactical battle management within the Air Force tactical air control system and the Army air ground system (TACS/AAGS), and the principles of maximizing Air Force and Army capabilities in the AirLand Battle. Emphasis is on the planning and management of theater air and land resources, the systems and procedures used to control joint forces and the coordination required to support decisionmaking. Focus is at Army division and Air Force air support operations center levels and higher.

The academic phase of the course covers the threat, tactical air operations and ground forces employment concepts, weapon systems, sortie generation potential, weapon effectiveness, logistics and communications support considerations; the command, control and communications countermeasures strategy; and command, control and communications intelligence systems and procedures. The course culminates with a "hands on" command post exercise in which Army and Air Force students participate as battle staff members. Army officer students are awarded additional skill identifier 5U (Air Operations Officer) upon successful completion. Normally, five Battle Staff courses are conducted each year.

The course is designed for field grade active duty and reserve component commissioned officers who are assigned, or scheduled for assignment, to any position requiring an understanding of the air ground system at the higher level. (NOTE: Commanders may waive grade requirements.) Examples of people who should attend are G3 and G2 staff officers and assistants (G3 Air, tactical surveillance officer); fire support coordinators; members of battlefield coordination elements, air defense command posts, and aerial reconnaissance and surveillance units; all liaison personnel with tactical fighter and reconnaissance units, control and reporting centers and tactical air control centers; other personnel whose duties involve air ground operations. Additionally, service school instructors who are involved in teaching subjects that require an understanding of the air ground system should attend the BSC as a part of their initial instructor training. Detailed information concerning the positions of unit personnel who should be trained in air ground operations is illustrated in figures 1 and 2.

Joint Firepower Control Course

The JFCC is also taught to a joint Army and Air Force student body. The emphasis in this course is on the control systems and equipment employed in the joint application of firepower in support of ground operations. This training is designed for Air Force officers who will provide support to Army maneuver units (division level and below) as forward air controllers or air liaison officers, and for Army officers and noncommissioned officers (NCOs)

Duty Position	Organization Level				Appropriate Course	
	Corps	Div	Maneuver BDE	Maneuver BN	JFCC	BSC
G3/S3 (Maneuver Units)						✓
G3 Air/Asst G3 Air						✓
Tactical Surv Officer & Asst						✓
S3 Air/S3 Air Opns NCO					✓	
G3 Air Opns NCO					✓	
G3 Plans						✓
G4 Plans/Air lift						✓
Fire Support Coord/Asst						✓
Fire Support Officer/NCO					✓	
FIST LT/NCO					✓	
FA Bn S3*						✓
Aerial Observer/FA Bn Asst S3*					✓	
FA Bn FSE/Opns NCO*					✓	
COSCOM G3/G4/DISCOM S3						✓
DISCOM Asst S3/S4					✓	
Avn Bn S3*						✓
Avn Bn Opns Off/NCO*					✓	
C/V Bn S3						✓
C/V Asst S3 (DAME)*						✓
ADA Airspace Mgmt Off						✓
ADA Airspace Mgmt NCO					✓	✓
ATC Opns Officer (DAME CAME)						✓
Avn Opns Officer (DAME CAME)						✓
S2/Asst S2/Intell NCO					✓	
Airlift Plan Off						✓
Signal Off						✓
Sig Bn S3/Asst*					✓	✓
Avn Officer						✓
Rear Area Opns Off						✓
G2/Dep G2/G2 Opns						✓
S2/BICC Chief						✓
MI Bn S3, Chief CM&D, IPS, TCAE, EWS*						✓
MI TOC Support Element*						✓

FIGURE 1: Personnel assigned, or projected for assignment, to positions shown in color blocks are appropriate candidates for attendance at the U.S. Air Force Air Ground Operations School in the courses checked.

*These positions are normally found in battalion-size units organic to the organizational level (corps or division).

Duty Position				Appropriate Course	
Air Defense Artillery	**ADCOM**	**BDE**	**BN**	**JFCC**	**BSC**
G3/S3					✓
Air Defense Liaison Off					✓
CRC Liaison Off					✓
CRC Liaison NCO				✓	
CAME/DAME Liaison Off					✓
G3/S3 Opn and Plans					✓
Battlefield Coordination Element				**JFCC**	**BSC**
Chief & All Assigned Officer Personnel					✓
NCOs				✓	
Liaison Personnel				**JFCC**	**BSC**
Ground Liaison Off (GLO)					
Assigned to Numbered Tactical Air Force					✓
Assigned to Tactical Fighter Wings				✓	
Air Recon Liaison Off (ARLOs)					✓
NCOs				✓	

FIGURE 2: Personnel assigned, or projected for assignment, to nonorganic units in positions shown in color blocks are appropriate candidates for attendance at the U.S. Air Force Air Ground Operations School in the courses checked.

who hold positions in the Army air ground system at the brigade level and below. The course teaches jointly approved concepts, procedures and techniques of combat operations, and the coordination and control systems involved in the air ground operations system. Students concentrate on planning and coordination within the TACS/AAGS at brigade and battalion levels. Army students attend the first 2 weeks of the 3-week course that trains Air Force personnel being assigned to tactical air control parties and tactical air support squadrons.

Army officers are awarded ASI 5U (Air Operations Officer) upon successful completion. NCO graduates are awarded ASI Q8 (Tactical Air Operations Specialist). Usually 10 courses are conducted each year.

The course is designed to train Active Army or Reserve Component commissioned officers and NCOs in grades E5 and above, assigned or programed for assignment to brigade level or below in any position requiring an understanding of the air ground operations system. Personnel assigned as S3, S3 Air, fire support coordinator, fire support officer, fire support team chief/sergeant, S2, assistant S2, forward observer or operations NCOs at all levels are appropriate candidates. Advisors to Reserve Components and other personnel whose duties involve air ground operations will also benefit from the course.

The fiscal year 1985 resident course schedule for both the BSC and the JFCC is listed in figure 3.

Nonresident Instruction

The Air Force air Ground Operations School can provide instruction to Army Active and Reserve Component units and to designated service schools. Such instruction is not a substitute for the resident courses nor does it fulfill attendance requirements of Army and Air Force personnel. The purpose of NRI is to respond to unique operational requirements.

Battle Staff Course	Joint Firepower Control Course
85-1 29 Oct—16 Nov 84	85-1 15-26 Oct 84*
85-2 21 Jan—7 Feb 85	85-2 19-30 Nov 84*
85-3 25 Feb—14 Mar 85	85-3 7-18 Jan 85
85-4 6-23 May 85	85-4 11-22 Feb 85
85-5 19 Aug—6 Sept 85	85-5 18-29 Mar 85
	85-6 22 Apr—3 May 85
	85-7 28 May—7 Jun 85
	85-8 1-12 Jul 85
	85-9 5-16 Aug 85
	85-10 9-20 Sep 85

Figure 3: The FY 85 Resident Course Schedule. *completed

Requests for NRI should be made to USAFAGOS/ED, Hurlburt Field, FL 32544. All requests should be submitted at least 45 days prior to desired date and include the following information:

- Instruction topics or unique information requirement.
- Justification: How the presentation will benefit the prospective audience and why scheduled courses cannot be used.
- Date instruction is requested and proposed alternate dates.
- Approximate size and composition of audience.
- Name and phone number of project officer.

The USAFAGOS commandant approves requests for NRI on a case-by-case basis. Upon approval, instructional facilities and equipment are coordinated. If desired, the instructor team can administer an examination and provide results to the commander of the unit concerned.

During an NRI visit, time permitting, a period should be set aside to permit AGOS personnel to meet informally with appropriate members of the unit or headquarters for the purpose of faculty enrichment.

How To Attend AGOS

Courses are listed in the Army formal schools catalog (DA Pamphlet 351-4) as 2G-F36 (BSC) and 2G-F37/250-F11 (JFCC). Army quotas are controlled by the Deputy Chief of Staff, Training, U.S. Army Training and Doctrine Command (TRADOC), Ft. Monroe, VA (ATTG-MPS, AUTOVON 680-2161; Commercial (804) 727-2161). Quotas are suballocated by TRADOC as follows: Active Army, Military Personnel Center, AUTOVON 221-8100; Army National Guard, National Guard Bureau, AUTOVON 584-4789; U.S. Army Reserve, Forces Command, AUTOVON 588-2715. Requests for attendance should be processed through unit training personnel. Additional information or assistance can be obtained by calling the USAFAGOS Army Element at AUTOVON 872-6889/6655 or Commercial (904) 884-6889/6655.

Department of the Army assignment officers may also determine attendance eligibility for active duty officers and enlisted personnel being assigned to units which have identified requirements (ASIs 5U, Q8) for air ground operations. Consequently, units should ensure requisitions for respective personnel include additional skill identifier requirements. Remember that USAFAGOS consolidates the principles, tactics and doctrine of all the services to train individuals and units to fight and win on the AirLand Battlefield.

Interested soldiers who want allocations for the Battle Staff and Joint Firepower Control Courses should contact their training officer for further information.

U.S. Army Information Systems Command
ATC ACTION LINE

National Airspace System Plan

YOU MAY HAVE read about the National Airspace System Plan (NASP) on this page in the past. It's a bold plan fostered by the Federal Aviation Administration (FAA) to improve the nation's air traffic control (ATC) system.

This plan has a lot of glamour systems that will impact upon all users and providers of the ATC system. Because Army aircraft use this system and Army ATC facilities provide service, we'll definitely be impacted. The Navy, Air Force and Marine Corps are in the same predicament.

These impacts have been a concern of the Department of Defense (DOD) Advisory Committee on Federal Aviation (DFA). The DFA is composed of general officers from the office of the Secretary of Defense, the Joint Chiefs of Staff and the services involved in operational matters. Because of their concern, they have established a full-time NASP working committee to review DOD impacts and to develop a parallel DOD plan which would show what airborne and ground systems are required by the DOD. Such a plan provides cost and time phasing data for DOD participation in the NASP.

Some of the glamour systems in the NASP are:

- The Microwave Landing System, a replacement for our Instrument Landing System and Precision Approach Radars (see page 20).
- The mode "S" data link; a new complex aircraft transponder and ground interrogator to pass messages back and forth reducing pilot/controller voice communication.
- The Traffic Alert Collision Avoidance System; uses a special ariborne transponder to warn the aircrew so they can avoid midair collisions.
- The Area Control Facility; consolidates present FAA centers and approach controls into a series of larger, highly automated facilities.

The NASP offers DOD benefits in the operation of our aircraft and in the operation of our ATC facilities. The DOD working committee has a big task ahead in determining what the benefits are and at what cost. The U.S. Army Air Traffic Control Activity—Aeronautical Services Office will provide Army representation (Mr. Odems, AUTOVON 284-7796/6304) on this committee. It's going to take a lot of coordination to do this job and we're going to need your help.

For additional information or clarification, contact Mr. John McKeeman, AUTOVON 284-7796/6304.

Readers are encouraged to address matters concerning air traffic control to:
Director, USAATCA Aeronautical Services Office, Cameron Station, Alexandria, VA 22314

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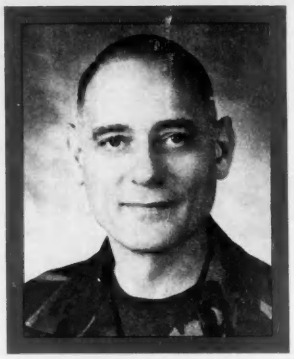

The AirLand Battle Doctrine has increased the need for training of Army personnel who must function in and use the Air Force Tactical Air Control System and the Army's Air Ground System. Additionally, the Memorandum of Agreement, dated 22 May 1984, between the Chiefs of Staff of the Army and of the Air Force reaffirmed a commitment to maximize our joint combat capability to execute AirLand combat operations.

The U.S. Air Force Air Ground Operations School (USAFAGOS), located at Hurlburt Field, FL, provides an immediate capability to instruct and train personnel in concepts, doctrine, tactics, techniques and procedures for conducting joint and combined operations. The Army does not always take maximum advantage of the quotas available to train our personnel, perhaps because the content and availability of courses may be unknown to many field commanders. In that regard, I solicit your support in increasing the awareness of the USAFAGOS courses through publication of the enclosed article in your magazine (page 40), or appropriate branch correspondence.

I also ask each of you to review your instructor training programs to ensure that all of the service school instructors who are involved in teaching joint and combined operations have appropriate background knowledge of the material presented at the USAFAGOS.

LTG Carl E. Vuono
Commander
U.S. Army Combined Arms
Center and Fort Leavenworth